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FLATHEAD BASIN COMMISSION

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Biennial Report

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Dedication

The members of the Flathead Basin Commission dedicate this first biennial report to its initial chairman, Thurman Trosper, who stepped down in January 1985. Trosper represented the Confederated Salish and Kootenai Tribes on the commission. Previously, he served as chairman of the Flathead River Basin Environmental Impact Study, which laid the information base for the ongoing work of the Flathead Basin Commission. Trosper's efforts to focus public and agency attention on pollution threats to the Flathead area have been unflagging, and major credit for the continuity of purpose in preserving the basin's water quality belongs to him.

Report Preparation

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GOVERNOR'S OFFICE
FLATHEAD BASIN COMMISSION

TED SCHWINDEN, GOVERNOR
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October 1, 1985

Governor of the State of Montana
Members of the Legislature

The 1983 Montana Legislature created the Flathead Basin Commission to "protect the existing high quality of the Flathead Lake aquatic environment; the waters that flow into, out of, or are tributary to the lake; and the natural resources and environment of the Flathead basin".

Achievement of the commission's purposes was to result from the opportunity for coordination offered by its composition: representatives of federal, state, local and tribal authorities with management duties in the basin as well as local citizens.

The commission attempts to enhance the basin's water quality by:

- monitoring the basin's natural resources;
- instilling cooperation and coordination among basin resource managers;
- holding public hearings on the condition of Flathead Lake
- encouraging economic development without compromising the basin's aquatic environment; and
- promoting international cooperation with British Columbia on resource development in the Flathead drainage.

The commission is required to "coordinate the development of an annual monitoring plan," to submit a "biennial report to the Governor and the appropriate committees of the Legislature," and to make recommendations the "commission considers appropriate for fulfillment of its duties." This first biennial report provides a comprehensive treatment of each legal reporting requirement.

Pressures for development in the Flathead basin present challenges and opportunities. The creation of the Flathead Basin Commission encourages a basinwide approach to water quality management in place of a fragmented jurisdictional network. The FBC remains committed to this goal in its second biennium.

Elwin Bennington

Elwin Bennington
Acting Chairman

publications & graphics

Introduction

Purpose, Duties and Authority

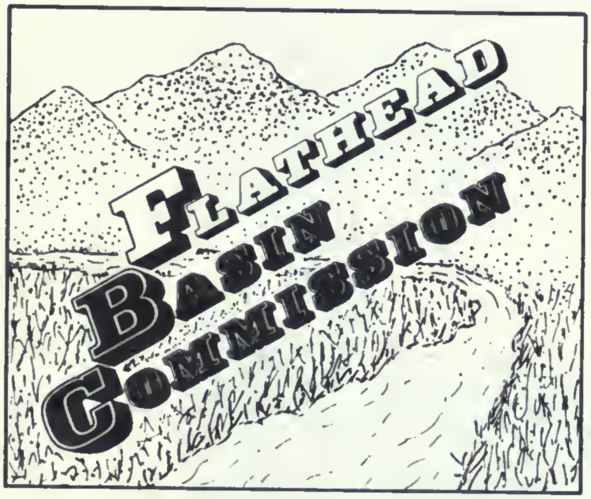
The Flathead Basin Commission (FBC) is a 15-member body created by the Montana Legislature to oversee and coordinate management and regulatory activities affecting the water quality in the Flathead basin.

The area contains a wide diversity of economic activities: proposed coal mines; oil and gas leases; timber sales; recreational subdivisions; and urban expansion. The Legislature recognized that finding a solution to water quality problems in the region was frustrated by multiple, overlapping agency jurisdictions. Therefore, appointments to the commission include basin citizens and representatives of agencies that regulate activities on local, state, federal, reservation and private lands.

The Flathead Basin Commission relies on various tools to achieve its objectives. These include:

- collection of **information** on water quality problems;
- **documentation** of violations of water quality standards;
- **analysis** of resource utilization and land-use trends;
- **persuasion** to achieve agency consensus on appropriate levels of development;
- the use of **publicity** to focus public awareness on problems and to reinforce mutual self-restraint by agencies; and
- the use of well-documented **recommendations** to the governor and the legislature to deal with crucial problems.

The commission's principal role is to coordinate the activities of the resource managers among its own membership. It must be able to foster a consensus on compatible resource development standards. In so doing, the commission continually needs to consult with the residents of the basin on their ideas for balancing economic development with preserving water quality. The commission can be no stronger than the commitment of the basin residents to preserving their quality of life.



Origins and Citizen Focus

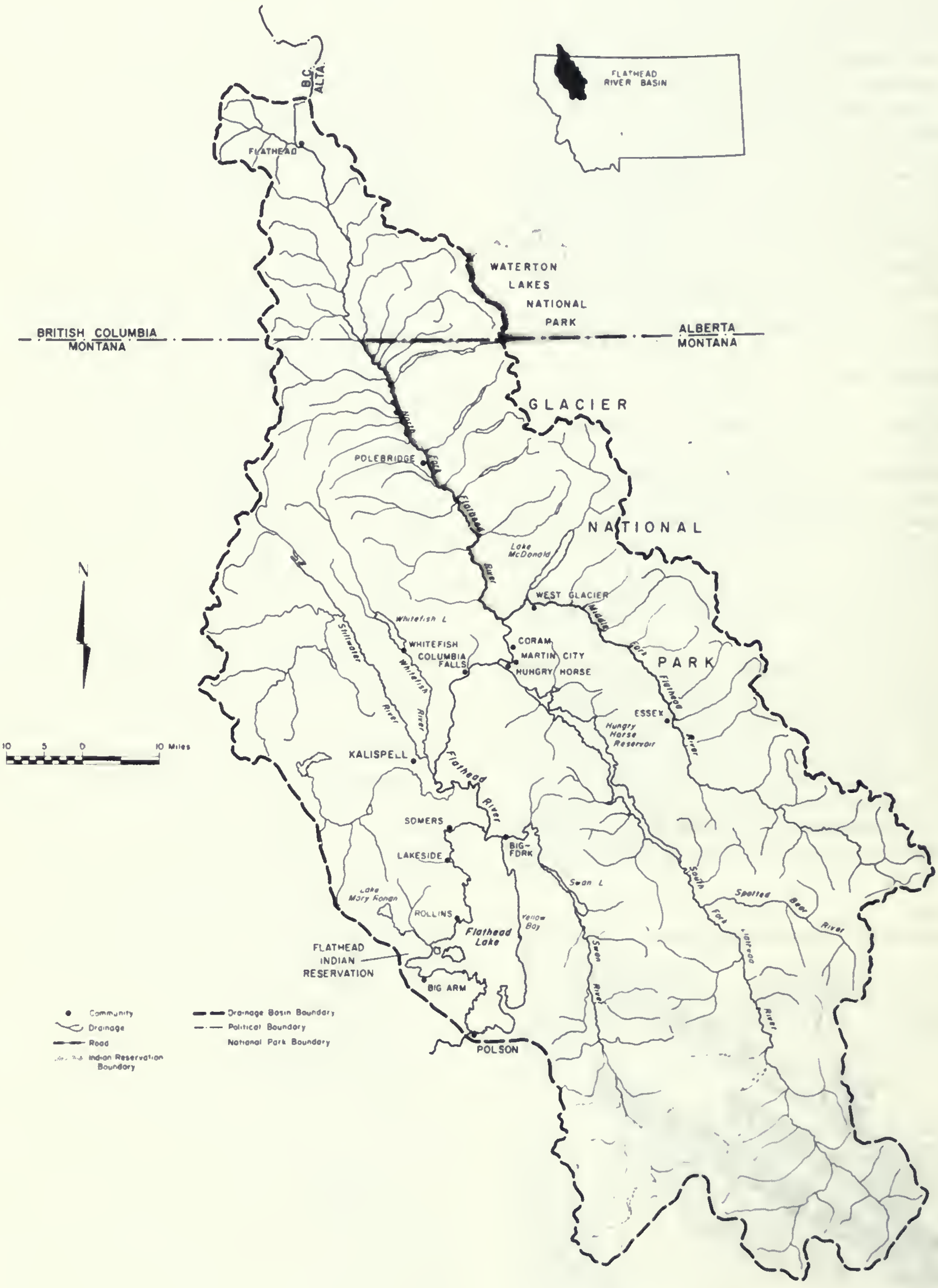
In the mid-1970s, concern over a prospective coal mining operation in the headwaters of the North Fork of the Flathead River across the Canadian border in British Columbia led to the creation of the Flathead Coalition. It soon became evident to these activists, however, that the threat of the Cabin Creek mine was not an isolated problem confronting the Flathead basin. "Backyard" activities could not be ignored either. Logging and mining brought economic growth but also posed threats to water quality. Subdivisions and other lakeshore development seemed to be growing by geometric proportions. Management practices at Hungry Horse Dam on the South Fork of the Flathead River and at Kerr Dam below Flathead Lake drew fire. Fish catches seemed to be dropping and residents noted a loss of water clarity.

In response to this diffuse but growing set of concerns, the Environmental Protection Agency (EPA), in 1974, initiated a study to evaluate water quality in the basin under Section 208 of the federal Clean Water Act. This act enables states to establish regulatory programs to control nonpoint source pollution. Following six years of study, the Flathead 208 Project report recommended greater coordination among agencies with regulatory authority concerning water quality and called for voluntary adoption of best management practices to control water pollution.

The Flathead Coalition, a conglomerate of many groups of concerned citizens, persisted in requests to the Montana congressional delegation to go a step beyond the 208 study. The EPA was convinced to authorize and fund a five-year Flathead River Basin Environmental Impact Study (FRBEIS) that was managed by a regional steering committee. The committee was made up of local representatives of the federal government (EPA, National Park Service and the National Forest Service), the state of Montana (Governor's Office and several executive agencies), the Confederated Salish and Kootenai Tribes, Burlington Northern, local governments and area citizens. This was the first time that such a federally funded study was managed, successfully, by local citizens.

Beginning in 1978, the FRBEIS sought to examine the underlying causes of diminished water quality. The FRBEIS steering committee addressed a wide range of subjects, including population growth, economic development, government, climate, recreation patterns, and fish and wildlife characteristics. The information gathered was to serve as a baseline of resource conditions against which changes could be measured.

Largely as a result of the FRBEIS efforts, the Montana Legislature created the Flathead Basin Commission in 1983 to be a permanent government entity to address these issues. The legislature intended that ordinary citizens representing local interests would have a forum for communicating with the appropriate state and federal agency officials. The commission holds all its deliberations in open meetings that basin residents are encouraged to attend. Its success ultimately depends on achieving consensus among community residents in support of the goals articulated by the commission.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FLATHEAD
FLATHEAD RIVER BASIN
WATERTON LAKES NATIONAL PARK
BRITISH COLUMBIA
MONTANA
ALBERTA
MONTANA
GLACIER
NATIONAL
PARK
POLEBRIDGE
North Fork Flathead River
Lake McDonald
WEST GLACIER
Middle Fork Flathead River
Whitefish L
WHITEFISH
COLUMBIA FALLS
CORAM
MARTIN CITY
HUNGRY HORSE
ESSEX
Hungry Horse Reservoir
Stillwater River
Whitefish River
KALISPELL
Flathead River
SOMERS
LAKESIDE
BIG-FORK
Swan L
South Fork Flathead River
Spotted Bear River
Lake Mary Ronan
ROLLINS
Flathead Lake
Yellow Bay
FLATHEAD INDIAN RESERVATION
BIG ARM
Swan River
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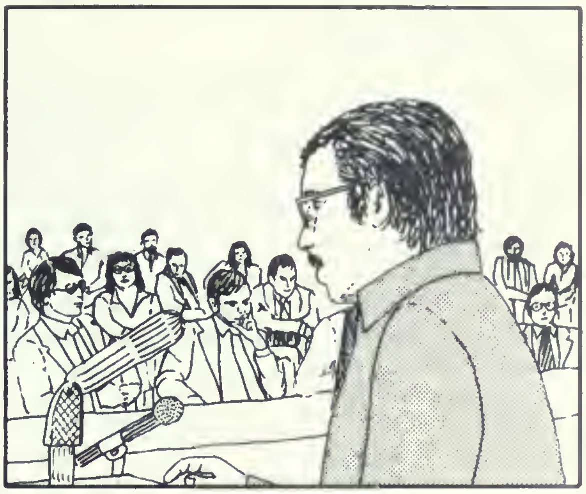
N
10 5 0 10 Miles
Community
Drainage
Road
Indian Reservation Boundary
Drainage Basin Boundary
Political Boundary
National Park Boundary

The Issue: Water Quality

Flathead Lake is known for its excellent cold water fisheries, low nutrient content, and limited plant productivity. But it is threatened with eutrophication, a process in which a lake fills and, during several millenia, becomes progressively shallower, warmer and more productive for plant growth. In 1983, the appearance of anabaena flos-aquae, a blue-green algae that forms toxins, signaled the vulnerable status of Flathead Lake's water quality.

Aging naturally, Flathead Lake would retain its crystal-clear (oligotrophic) quality for centuries. But the lake's quality has declined measurably in the past 20 years because of nutrient loading. Phosphorus is the limiting nutrient in Flathead Lake: the amount of phosphorus that is "biologically available" as food determines plant productivity. Nutrients derived from sewage, detergents, fertilizers, industrial discharges, and sediments from agriculture, construction and logging practices—all examples of "cultural eutrophication"—have stimulated the growth of aquatic plants, including algae. About 100 tons of biologically available phosphorus enters Flathead Lake each year. Not all of the phosphorus in the lake is biologically available, but human-caused activities in the basin have increased this phosphorus by 20 to 40 percent (Phosphorus Strategy, 1984).

Recent measurements of algal productivity place Flathead Lake beyond the acceptable limits for oligotrophic lakes. Flathead Lake is at a "threshold"—even small additions of nutrients could cause noticeable increases in plant productivity, and eventual replacement of trout, kokanee and other desirable species with rough fish. The problem Flathead Lake faces is not unique—smaller lakes in the basin, including Lake Mary Ronan, demonstrate more advanced cases of nutrient loading.



The commission can be no stronger than the commitment of the basin residents to preserving their quality of life.

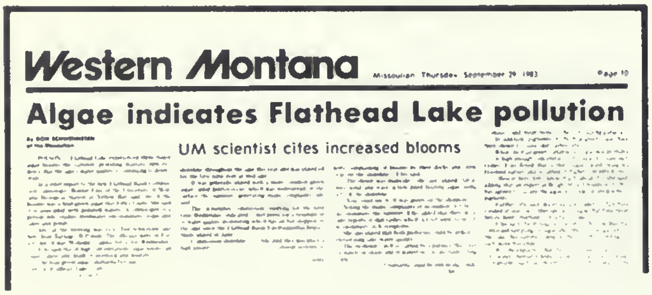
Heavily polluted lakes, Lake Erie for example, are overwhelmed by a variety of problems: small changes in their nutrient budgets make little difference. Pristine lakes, however, are vulnerable to even small nutrient additions. Lake Tahoe, second in surface area to Flathead Lake among western freshwater lakes, continues to suffer water quality problems despite experiencing only half the nutrient input of Flathead Lake.

Water Quality Standards Enforcement

Virtually all land use activities ultimately affect water quality. Many basin agencies charged with land management or regulation have specific duties to implement laws and apply regulations to protect water quality. The principal laws are the federal Clean Water Act (PL 92-500) and its counterpart, the Montana Water Quality Act (75-5-101, et. seq., MCA).

The federal Clean Water Act assigns four basic tasks: 1) regulation of pollutant discharges from point sources; 2) regulation of spills of oil and hazardous substances; 3) financial assistance for sewage treatment plant construction; and 4) promotion of local efforts to control nonpoint source pollution.

The Montana Water Quality Act closely approximates the same goals. It proscribes water pollution and contains the primary enforcement mechanism for prohibiting, enjoining and penalizing pollution. **Point sources** are regulated by a permit system, and **nonpoint sources** are controlled by the adoption of best management practices (75-5-306(2) MCA, ARM 16.20.701(b)(i).



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Algae indicates Flathead Lake pollution

UM scientist cites increased blooms

Other pertinent state laws include: the Streambed and Lakeshore Preservation Act, which regulates development activities taking place in streams and lakeshores; the Public Water Supply Law, which regulates logging and other activities with respect to their impact on water quality in watersheds used for public water supplies; and the Sanitation in Subdivisions Act and the Subdivision and Platting Act, which together provide for state and local review of proposed subdivisions.

Relevant tribal law includes a Shoreline Protection Ordinance (Ordinance 64-A revised) that regulates within the Flathead Reservation certain structures, dredging, and filling below the high water mark on Flathead Lake and on Flathead River and its major tributaries.

The following section addresses how the various agencies in the Flathead basin are affected by these legal mandates to control water quality. Some of the agencies are primarily land and resource managers and others are primarily regulators. The agencies that have management responsibilities must ensure that their own activities do not violate water quality standards. Regulatory agencies are concerned that actions by private parties—or by other agencies—also do not violate these standards.

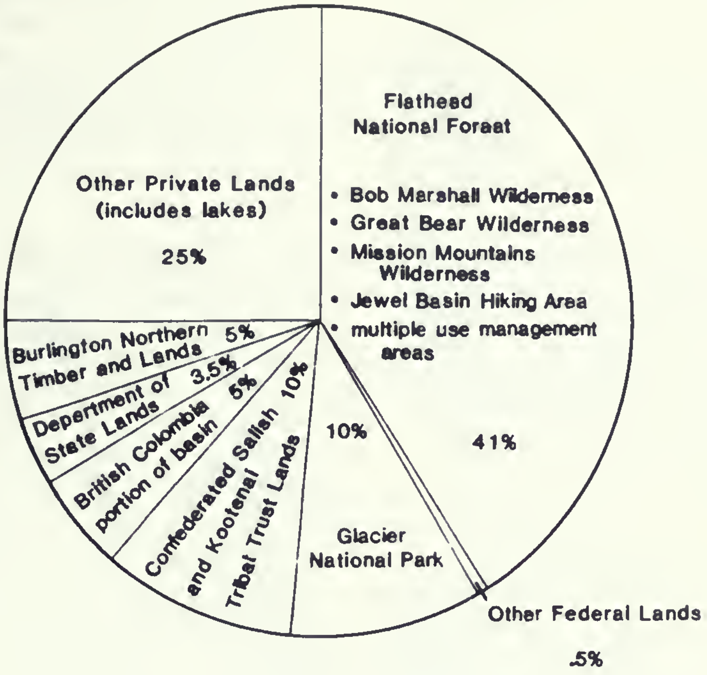
Federal Level

U.S. Forest Service - Flathead National Forest

The U.S. government controls slightly more than half of the land within the Flathead basin, and the majority of these federal holdings are administered by the Forest Service. Flathead National Forest lands consist primarily of timbered tracts on the eastern half of the basin and northwest of Flathead Lake. These lands are managed under the "multiple-use concept," which recognizes timber, watersheds, recreation, range, and fish and wildlife as important renewable resources, and attempts to achieve a balance between commodity and non-commodity uses. The Resources Planning Act of 1974 and the subsequent National Forest Management Act of 1976 set resource production goals and mandate long-term forest planning with public involvement.

Both the federal Clean Water Act and presidential executive orders (12088 and 13072) require the Forest Service to comply with state water quality standards, provided that those standards are at least as stringent as those in the federal act. In Montana, the statewide 208 Water Quality Management Plan designates the Forest Service as the nonpoint source management agency for national forest lands. The Water Quality Bureau and the Forest Service maintain a cooperative agreement for this purpose. There is concern that cutbacks in Forest Service watershed programs could jeopardize the Forest Service's compliance with the agreement.

The Forest Service has primary responsibility for administering the 219 mile long Flathead Wild and Scenic River system. Glacier National Park and the state of Montana retain management responsibilities for lands within the designated river boundary (11,800 acres and 900 acres respectively). Management of these lands is coordinated through a Memorandum of Understanding. The remainder of the River Management Zone (44,700 acres) is administered by the Flathead National Forest.



FLATHEAD RIVER BASIN LAND OWNERSHIP

U.S. Portion of Basin		**% Ownership**
Private Lands		
Burlington Northern Timber and Lands	274,372	5
other Private (includes lakes)	1,567,022	2.5
Confederated Salish and Kootenai Tribal Trust Lands		
Mission Mountain Tribal Wilderness	89,500	1.5
other Trust lands	484,128	8.5
State Lands		
Department of State Lands		
Coal Creek State Forest	15,064	
Stillwater State Forest	93,815	
Swan River State Forest	38,345	
other state forest lands	41,749	
other state lands	1,722	3.5
Department of Fish, Wildlife and Parks	3,025	
Federal Lands		
Glacier National Park	614,882	10
Flathead National Forest		
Bob Marshall Wilderness	709,356	
Great Bear Wilderness	286,700	
Mission Mountains Wilderness	73,877	
Jewel Basin Hiking Area	15,000	
multiple-use management areas	1,264,999	41
U.S. Fish and Wildlife Service		
National Bison Range	18,540	
Pablo Wildlife Refuge	2,500	
Ninepipes Wildlife Refuge	2,023	
Swan River Wildlife Refuge	1,576	
other federal wildlife lands	4,555	.5
SUBTOTAL	5,405,550	
British Columbia Portion of Basin	274,280	5
	5,679,830	100 %

(Source : Flathead River Basin Environmental Impact Study)

The U.S. Environmental Protection Agency

The Environmental Protection Agency has primary responsibility for the prevention and correction of water pollution under the federal Clean Water Act. It can delegate part of its authority to state and local programs for pollution clean up, for monitoring or for research.

The EPA works closely with the Montana Water Quality Bureau in assessing, preventing and controlling water quality problems. The EPA also disburses federal funds to the bureau for construction programs to upgrade central sewage collection plants. It enters into agreements with the state under Section 208 of the Clean Water Act for nonpoint source management programs, and it designates potential sites for receipt of "Superfund" cleanup assistance.

U.S. National Park Service - Glacier National Park

Glacier National Park was created in 1910 and became part of the Waterton-Glacier International Peace Park, which was jointly established in 1932 by Congress and the Canadian Parliament. The 1,600 square mile area of rugged mountain country straddles the Continental Divide. The North Fork of the Flathead River is the western boundary of the park and the Middle Fork is the southern boundary. To the south and west lie national forest lands within the Flathead National Forest. To the southeast is the Bob Marshall Wilderness, source of the South Fork of the Flathead. The Canadian Waterton portion lies entirely on the east slope, in Alberta; there is no comparable park or wilderness buffer for Glacier Park to the north in British Columbia.

The park contains a significant portion of the Flathead basin's headwaters and represents the largest contiguous undeveloped part of the region. The broad management goal is to perpetuate the natural ecosystems within the park in as nearly pristine conditions as possible for recreational, educational, cultural and scientific values. The Park Service has identified several management objectives consistent with the ecosystem approach to managing the Flathead basin:

- encourage or conduct a comprehensive program in natural science research to provide scientific criteria for the conservation, management and/or restoration of natural ecosystems;
- cooperate with other governmental agencies, private organizations, the Blackfeet Tribe, and members of the public to ensure that land use in the park's vicinity is compatible with long-term perpetuation of park values;
- manage the park's lakes and streams to promote natural propagation of native aquatic life; and
- reduce, to the absolute minimum, the introduction of alien materials, such as pesticides and all pollutants, into the park's environment (Glacier National Park, 1979).

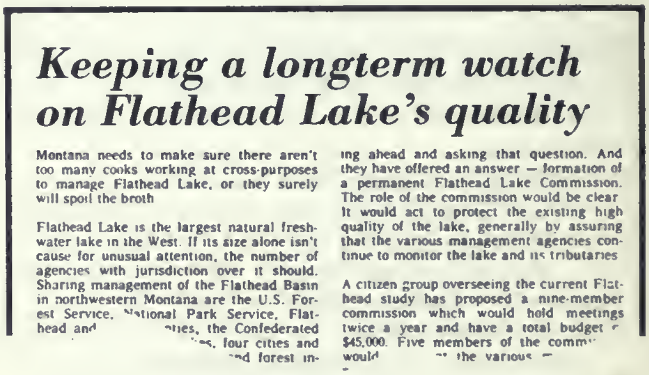
Glacier Park undertakes extensive monitoring efforts to detect changes in air and water quality.

The U.S. Fish and Wildlife Service

The U.S. Fish and Wildlife Service has responsibilities for migratory birds, endangered species and wildlife refuges. This agency manages key wildlife tracts within the Flathead basin including the National Bison Range, the Swan River Wildlife Refuge, the Creston Fish Hatchery, and the Pablo and Ninepipes Refuges.

The U.S. Bureau of Reclamation and Army Corps of Engineers

These two federal agencies have authority over construction activities on all navigable waters. Dam construction, dredge-and-fill operations and other related activities come under their purview. The Bureau of Reclamation operates the Hungry Horse Dam and controls reservoir water levels and downstream river flows. The Corps of Engineers administers the regulatory program pursuant to Section 404 of the Clean Water Act for the discharge of dredged or fill material into the waters of the United States. It also directs the regulation of Flathead Lake levels for flood control pursuant to Article 21 of the Federal Power Commission license issued May 1930 for the Kerr Hydroelectric Project. Further, it conducts water resource investigations, most recently for flood control and hydropower development in the basin.



Keeping a longterm watch on Flathead Lake's quality

Montana needs to make sure there aren't too many cooks working at cross-purposes to manage Flathead Lake, or they surely will spoil the broth

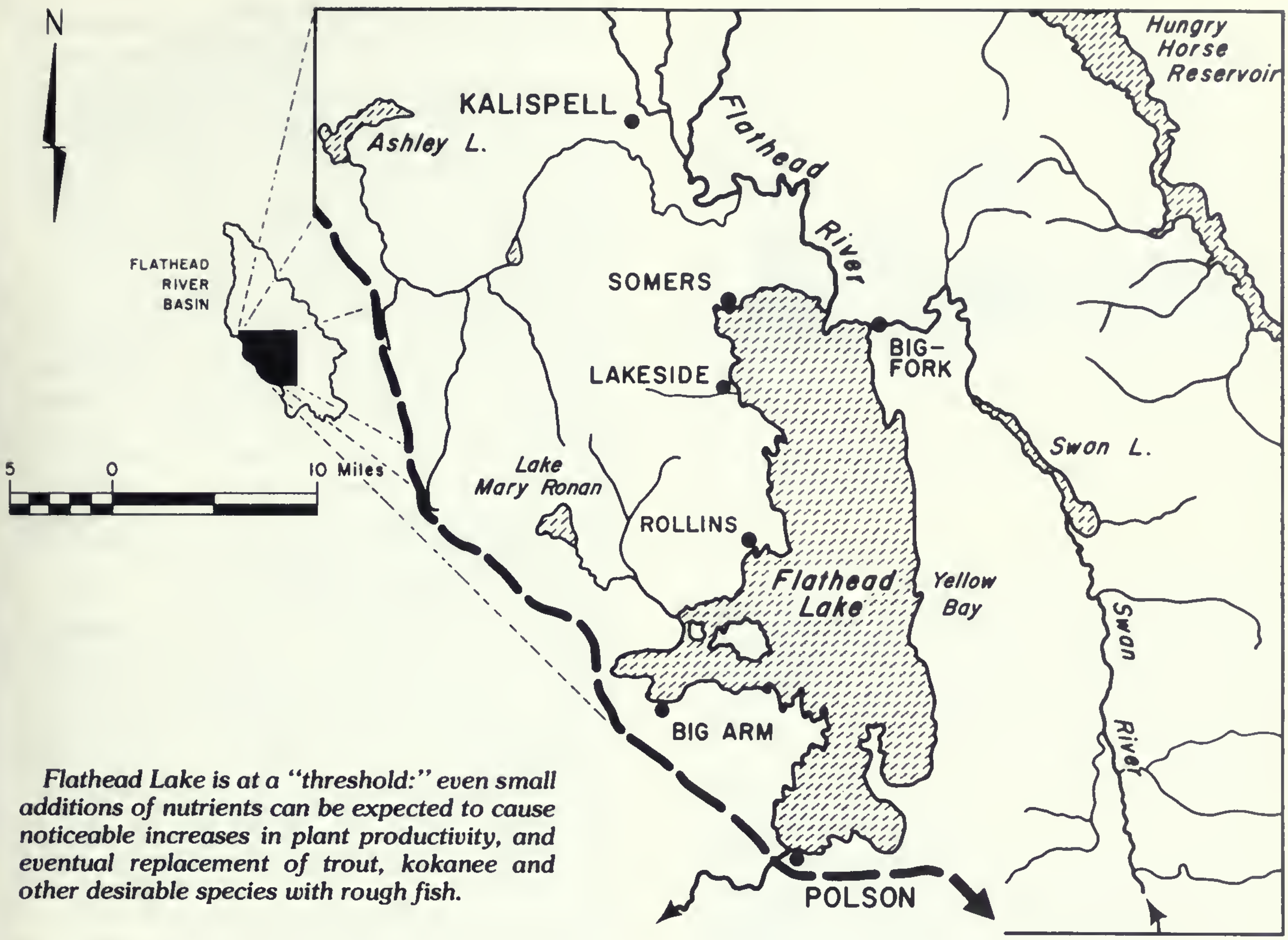
Flathead Lake is the largest natural freshwater lake in the West. If its size alone isn't cause for unusual attention, the number of agencies with jurisdiction over it should. Sharing management of the Flathead Basin in northwestern Montana are the U.S. Forest Service, National Park Service, Flathead and [illegible], the Confederated [illegible], four cities and [illegible] forest in-

ing ahead and asking that question. And they have offered an answer — formation of a permanent Flathead Lake Commission. The role of the commission would be clear It would act to protect the existing high quality of the lake, generally by assuring that the various management agencies continue to monitor the lake and its tributaries

A citizen group overseeing the current Flathead study has proposed a nine-member commission which would hold meetings twice a year and have a total budget [illegible] $45,000. Five members of the comm[illegible] would [illegible] the various [illegible]

Bonneville Power Administration (BPA)

The Bonneville Power Administration markets power from federal dams in the Columbia River drainage system including Hungry Horse and Libby. The BPA's power grid requirements influence the levels and flows of these and other downstream dams. The BPA, under the recent Northwest Power Planning Act, has initiated fish and wildlife studies in order to assess the impact of hydropower development on habitat and reproduction and to recommend possible mitigation measures. The BPA has funded over a dozen recent studies in the Flathead basin, most of them conducted by the Montana Department of Fish, Wildlife and Parks and the Confederated Salish and Kootenai Tribes.



Flathead Lake is at a "threshold:" even small additions of nutrients can be expected to cause noticeable increases in plant productivity, and eventual replacement of trout, kokanee and other desirable species with rough fish.

Federal Energy Regulatory Commission (FERC)

Under the Federal Power Act, the Federal Energy Regulatory Commission has licensing authority for virtually all non-federal hydropower projects. In the past few years, FERC has reviewed more than 100 applications to construct small-scale hydropower (or micro-hydro) projects on Montana streams and rivers, many of these in the Flathead basin. This activity was stimulated by the passage of the 1978 federal Public Utilities Regulatory Policies Act (PURPA), which subsidizes the sale of power from renewable facilities of up to 80 megawatts. The Montana Public Service Commission sets the level of these purchase benefits when it determines the "avoided cost" to a utility to build a new power plant.

U.S. Geological Survey (USGS)

The Geological Survey monitors the elevation of Flathead Lake and the release of water at Kerr Dam. It also monitors Whitefish Lake and most of the basin's tributary streams. These data, accumulated over many years, constitute a valuable base for increasing the understanding of the basin's water resources. The USGS monitoring station on the North Fork of the Flathead River at the international border also provides important baseline data that could become an important reference if the proposed Cabin Creek mine is opened.

Soil Conservation Service (SCS)

The Soil Conservation Service provides technical and financial assistance for erosion control to landowners and public agencies. Priorities for assistance are set by the local soil and water conservation districts (see below). The SCS is also responsible for soil and snow surveys.

State Level

Department of State Lands

The Department of State Lands has jurisdiction over two major areas affecting water quality in the Flathead basin. One is the administration of state-owned land; the other is the administration of Montana's three principal mined-land reclamation statutes that apply to both public and private lands.

The Board of State Land Commissioners exercises general authority over the administration of laws relating to state lands and forests, including the management and disposition of the lands and the administration of funds accruing from the use and lease of those lands. Departmental activities on state lands include saline seep control, metaliferous and non-metaliferous mineral leases, oil and gas leases, supervision of grazing leases and timber sales. The department complies with the Montana Water Quality Act and related federal environmental quality statutes in its management and regulatory duties.

Like the U.S. Forest Service, the department must balance its mandate to produce sustained revenue from land use and its obligation to uphold environmental considerations. Montana law directs the department to generate sustained revenues from state lands; unlike the U.S. Forest Service, it may not set aside for other uses lands that can produce revenues.

The Department of State Lands has other concerns in the Flathead basin. First, it administers the state's ownership responsibility for all navigable stream and lake beds in the basin (outside of tribal jurisdiction). This responsibility has far-reaching implications in the event of permit applications for oil or mineral leases on the bottom of Flathead Lake or the tributary beds. Second, it has a cooperative agreement with the Flathead National Forest dealing with approximately 900 acres of state land within the Flathead Wild and Scenic River system. The Department of State Lands is to blend its management activities into the landscape in a manner so as not to draw attention to the activity from viewers on the river. Third, it has entered into an interlocal agreement with the Whitefish Water and Sewer District because the headwaters of the district's water supply lie within state-owned lands; the department is conducting a four-year watershed management study in the headwaters area.

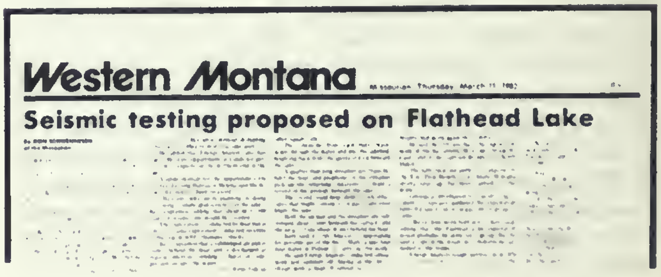
Department of Health and Environmental Sciences (DHES)

The federal Clean Water Act amendments of 1972 and 1977 call for states to make all waters "fishable and swimmable" by 1983. Montana has adopted standards to meet this goal (75-5-01, et. seq. MCA). The state's streams and rivers were classified according to their existing water quality at the time of the law's passage. This classification required both upgrading polluted streams and maintaining the highest beneficial use of non-polluted ones. The DHES Water Quality Bureau administers the Montana Water Quality Act through a number of rules that include a surface discharge permit program (the Montana Pollutant Discharge Elimination System) and groundwater regulations (the Montana Groundwater Pollution Control System). Because state waters were often of higher quality than required by federal standards, Montana also has a "nondegradation" policy (75-5-303, MCA). This policy was adopted prior to federal legislation and serves as an additional safeguard against water pollution.

The surface discharge permit program regulates discharges from industrial activities and municipal sewage treatment facilities. To obtain a discharge permit, an applicant must have an acceptable wastewater treatment plan that limits the pollutants that could be discharged to state waters. The Water Quality Bureau also administers a Construction Grants Program that channels federal funds into local sewer system improvements. The EPA funds 55 percent of the construction (75 percent prior to October 1, 1984). Flathead basin communities are working closely with the Water Quality Bureau to upgrade their wastewater treatment facilities to meet discharge requirements.

The bureau adopted groundwater regulations in 1982. The regulations require a permit for any surface activity that may adversely impact groundwater quality and is not currently controlled by another regulatory authority. Rules for individual septic systems are covered in the groundwater quality standards.

In addition to its permit system and stream classification activities, the bureau monitors the biological and chemical content of streams throughout the state. These monitoring activities are coordinated with the Flathead basin water quality monitoring master plan. In 1984, the Water Quality Bureau adopted a phosphorus control strategy for Flathead Lake that included a phosphorus limit on municipal waste water discharges.



Western Montana

Seismic testing proposed on Flathead Lake

Department of Natural Resources and Conservation (DNRC)

The DNRC and administratively attached boards have jurisdiction over several activities affecting water development projects, oil and gas drilling, major facility siting, and soil and range conservation programs. The department is directly responsible for matters of water flow and uses, water quantity and water development.

The state's Water Development Program at DNRC is intended to promote and advance the beneficial use of water, and to allow Montanans to achieve full use of the state's water by providing extensive financing for water development projects and activities. Projects include hydropower development, construction of dams and reservoirs, development of water supply, water treatment, rural water systems, and water conservation measures.

Flathead basin municipalities have applied for Water Development Program loans to provide their match for federal funds available through the Water Quality Bureau's Construction Grants Program. Municipalities also can apply to the DNRC program for the full amount in the event that the federal funds are not available.

The DNRC provides technical support for a variety of special district authorities: grazing, conservation and irrigation. These districts are created at the local level and DNRC has only advisory powers. The Lake and Flathead County Conservation Districts and the Lake and Flathead County Grazing Districts are examples of special use districts in the Flathead basin relying on DNRC assistance.

Grazing districts are empowered to control range reseeding, weed control, conservation and improvement measures. Goals are to protect range land from degradation, ensure adequate wildlife forage, and protect dependent non-range land.

Conservation districts have broad authority to study and regulate the use of the land. Districts may prepare comprehensive plans for soil or water conservation, for flood protection, and for development and disposal of water in the district. District supervisors have the authority to prepare and adopt regulations that may require specification of engineering methods of cultivation and grazing, to control erosion and to conserve soil.

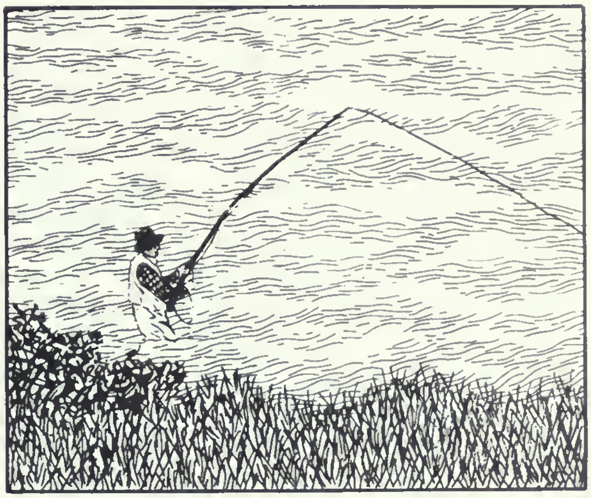
Irrigation and drainage districts can be formed to appropriate, transport and acquire water and water rights or to transport and drain water across the land of others.

The Department of Fish, Wildlife and Parks (DFWP)

This department is mandated to protect the waters of all lakes, streams and ponds for fish propagation. This is a broad mandate and the DFWP carries out many activities that influence water quality in Montana.

The Montana Natural Streambed and Land Preservation Act (Section 310 permit program), requires private parties to file notice with the local conservation district before beginning any activity on public or private lands that would obstruct, damage or modify the existing form of a stream or streambank. The notice is subject to review by the DFWP. If the department finds that the proposed project adversely affects any fish or game habitat, it will recommend modifications or alternatives to mitigate the effects of the project. Conservation district board members, applicants for streambed alterations and DFWP personnel often participate as team members on 310 program inspections. Initial permit authority rests with the local conservation districts but disagreements among inspection team members may be taken to arbitration.

Under the Water Use Act of 1973, Montana and its agencies were allowed to apply for reservations of water to maintain minimum stream flows. The DFWP has done so, most notably on the Yellowstone River, and plans more reservation filings in the future. In the Flathead basin, the DFWP has recommended minimum flows from Hungry Horse and Kerr Dams at specified times of the year. The DFWP has by legislative mandate established minimum instream flows for fisheries on the three forks of the Flathead.



The summer 1983 appearance of anabaena flos-aquae, a blue-green algae that forms toxins, signaled the highly vulnerable status of the quality of Flathead Lake's waters.

Perhaps more than any other basin authority, the DFWP closely monitors basin activities, including lakeshore and streambank alterations, dam flow regimes, logging and road building activities in area watersheds. The DFWP often serves as the "trigger," or eyes and ears of the other agencies through implementation of the state's 310 permit process, lakeshore protection regulations, instream reservations, federal small hydropower development permits, the 404 permit system, and national forest plans. Though not necessarily wielding formal authority in these matters, the DFWP, reinforced with documentation collected through numerous basin studies, plays a vital role in most water quality issues.

Local Level

Counties

Counties have widely dispersed duties that affect water quality matters. The Flathead basin contains portions of seven counties. Flathead County in the north and Lake County in the south contain most of the land area and population.

Counties are authorized to act in matters affecting water quality through land-use controls. They may establish a planning and zoning district and zoning can be used to attain compliance with a comprehensive development plan. Zoning regulations also may control urban uses, but agricultural, forestry and mining activities are specifically exempt because they are managed under other jurisdictions. Flathead County has a comprehensive land-use plan and intends to update its master plan in the near future. Lake County is currently engaged in a planning process to develop a plan.

Other controls are derived from the Subdivision and Platting Act and the Sanitation in Subdivisions Act. Each county and incorporated city must enforce local subdivision rules that specify procedures and design standards by which a proposed subdivision is reviewed and approved. The rules require that a subdivision be disapproved if it is proposed on a flood plain, in an area of high groundwater, on steep slopes, or in a naturally hazardous area. Potential impacts on the natural environment must be addressed, including impacts on wildlife and public health and safety.

The county board of health and municipal sanitation departments also have important roles in regulating sewage disposal resulting from urban fringe and rural development. Counties regulate other activities with respect to soil erosion or water quality: solid waste disposal, mosquito and weed control, and county roads. Counties also have permit authority under the Montana Shoreline Protection Act to review projects that could alter or diminish the course, current, or cross-sectional area of a lake or its lakeshore.

Cities

Incorporated cities and towns can affect water quality directly through the powers of eminent domain and the approval of water and sewer systems. Indirectly, these municipalities also can affect water quality through zoning, annexation and planning. Zoning regulations must conform to a comprehensive plan designed to promote health, prevent the overcrowding of land, avoid excessive population concentration, and help provide adequate water and sewerage. Although city planning boards and city-county planning boards are authorized to promote the orderly development of the governmental units and their environs, they serve only in an advisory capacity to the local governing bodies. Kalispell, Whitefish, Columbia Falls and Polson are involved in joint city-county planning efforts with their respective counties.

Water and Sewer Districts

Water and sewer districts are formed by local citizens for watershed protection, use and improvement. Water and sewer districts are created through local voter approval and are given broad powers under Montana law to address area water quality concerns (Section 7-13-22, MCA). The Whitefish Water and Sewer District is preparing a water management plan to protect the area's water quality and to provide adequate water and sewage treatment facilities. Others in the basin include: Bigfork Water and Sewer District, Lakeside Water District, Evergreen Water and Sewer District, and Somers Water and Sewer District.

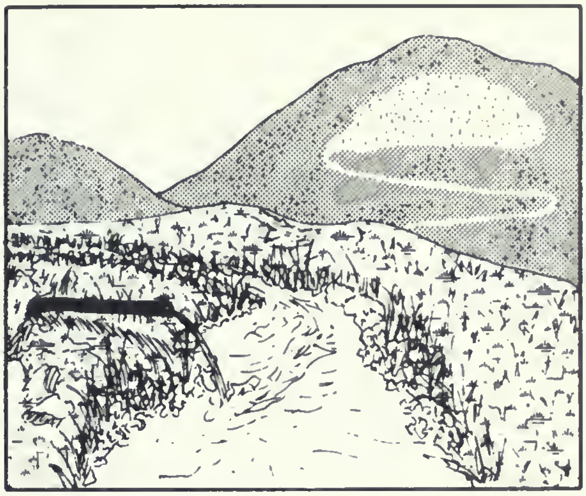
Confederated Salish and Kootenai Tribes

The Flathead Indian Reservation encompasses approximately one-fifth of the basin area, including the southern half of Flathead Lake and most of the lower Flathead River drainage. Land on the reservation held in trust for the Tribes by the United States is administered by the Confederated Salish and Kootenai Tribal Council, the reservation's 10-member elected governing body (about half of the land within the reservation boundaries is privately owned).

Timber, agriculture, water and tourism are emphasized under current management direction, and the Tribes derive a substantial portion of their income from resource management. Tribal policy regarding all resource management, corresponds closely to the Flathead Basin Commission's own mandate. The Natural Resources Department is charged with maintaining "a careful balance between the development of and the protection of natural resources on the Flathead Reservation" through interdisciplinary planning and review of activities affecting natural resources by the twelve programs in the department involved in research, planning, management and regulation.

The Tribes manage the Mountain Tribal Wilderness Area, designated by the Tribal Council in 1982, which covers the west slope of the Mission Mountain Range and abuts the national forest wilderness lying to the east across the Mission Crest in the Flathead Forest. The Tribes also have succeeded in having the Flathead Reservation designated a Class I or pristine airshed, one of only two such designations of Indian reservations in the nation. A funding proposal to EPA for a comprehensive baseline water quality study is being prepared. The Tribal staff is conducting research in several areas, including water quantification, water use, fisheries, and wildlife, most of which involve some level of basic water quality data gathering and the Tribes help support the water quality research conducted by the Flathead Lake Biological Station.

Sources of Water Quality Deterioration



Sources of water pollution are categorized under two general types: point source and nonpoint source. The federal Clean Water Act defines "point source" as:

> *any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, well, conduit, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating facility, from which pollutants are or may be discharged. Section 502(14)*

The same law defines "nonpoint source" as:

> *agriculturally and silviculturally related nonpoint sources of pollution, nonrelated sources of pollution, including new, current, and abandoned surface and underground mine runoff, and construction activity related sources of pollution. (Section 208(b)(2)(F,G,H)*

Point source pollution is exemplified by inadequate municipal wastewater treatment, failure of septic systems and unchecked industrial effluents. Nonpoint source pollution is illustrated by runoff from land under a variety of land-management practices including forestry, agriculture, subdivisions and commercial development. The distinction, in practice, between the two sources is not always clear.

Point Source Pollution

Point source pollution usually receives more attention than nonpoint source pollution because the manifestations are easier to identify. Flathead and Lake counties contain a large number of small communities (compared with the Montana norm) and considerable outlying second-home developments. Consequently, wastewater treatment systems and septic tanks are a focus of concern.

Sewage Treatment

The phosphorus coming from the four wastewater treatment plants upstream from the lake (Kalispell, Whitefish, Bigfork and Columbia Falls) is estimated at 20 metric tons per year (Stanford, 1985). Using present growth estimates, the total amount of phosphorus entering Flathead Lake from these four sewage treatment facilities could double by the year 2000 unless the plants are upgraded.

Ashley Creek, the recipient of Kalispell's sewage effluent, provides a controversial example of wastewater treatment. The creek is a slow-moving, slough-type stream and hence the treatment plant discharge cannot be quickly diluted to acceptable levels. Ashley Creek was found to be in violation of the federal standard that requires all streams to be "fishable and swimmable" (Kalispell PER, 1985). The installation of secondary sewage treatment facilities allowed Ashley Creek's status to be changed from E-2 (nonswimmable and nonfishable) to C-2 (fishable and swimmable).

Nonetheless, the Water Quality Bureau subsequently documented levels of dissolved oxygen (DO) so low as to be detrimental to fish survival at least six miles from the plant. And, despite the addition of chemical precipitation for phosphorus removal, Ashley Creek was found to contain unacceptable levels of phosphorus. Ammonia was also considered a problem. For a variety of technical design reasons, attempts to bring the Kalispell system into compliance have not been successful. Studies by the Flathead Lake Biological Station at Yellow Bay (FLBS) indicate that adequate controls at the Kalispell plant could reduce its annual input of phosphorus to Flathead Lake by 8.5 tons (compared with the total annual input of approximately 100 tons).

The Water Quality Bureau has completed a Preliminary Environmental Review (PER) that describes alternatives for the city of Kalispell. One option, to pipe the treated effluent directly to the Flathead River, would likely violate existing nondegradation standards by reducing the river's water quality. Land application of treated effluent would require the purchase of a large tract of land and might create offensive odors. A third alternative is to construct a large holding pond where treated water could be withheld from Ashley Creek during critical times of the year.

Upgrading wastewater treatment is often the preferred alternative for phosphorus control because it is technologically possible. It is not necessarily the most economical approach or the most equitable way of assigning costs for controlling phosphorus but it is currently the most certain technology.

Flathead commissioners OK funds for sewer treatment study

Septic System Failures

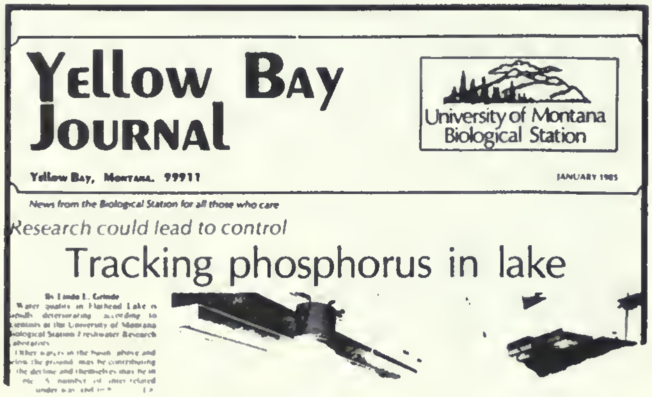
Approximately 1,800 residents in the Evergreen area northeast of Kalispell do not have a central sewer system. The heavy concentration of septic tanks in the area's porous soils has contaminated the area groundwater. Sanitary restrictions—sanctions prohibiting new water and sewer installations—have been imposed by the Water Quality Bureau until the problem is resolved.

Members of Evergreen's Water and Sewer District want to install a sewage collection treatment system and disposal facility. They have approval from the DNRC's Water Development Program for a $3,226,900 loan. These funds will be used as Evergreen's matching share to qualify for federal funding for the balance. Local voter approval is now required to accept the conditions of the program's loan repayment provision. Without a central system, the contaminated groundwater will spread and ultimately contribute to the nutrient load of Flathead Lake.

The Lakeside County Sewer District also has applied for a DNRC Water Development loan to construct a central sewage collection system. Many of its 400 individual sewage systems are failing and instances of contaminated groundwater have been reported.

Studies of Whitefish Lake indicate that shoreline septic systems could be responsible for significant phosphorus contributions. In cooperation with the Whitefish County Water and Sewer District, the EPA identified possible septic system problems. Testing detected 147 possible septic system failures, a possible sewer line break, and a possible source of industrial pollution. Evidence consisted of 33 leachate plumes in the lake (Montgomery, 1985).

The Flathead Lake Biological Station is undertaking a similar septic system study of Flathead Lake. Preliminary results verified septic seeps from 82 percent of the areas surveyed. The technology used in the studies on both lakes—remote or infra-red sensing and field fluorometry—permit fairly accurate identification of failing systems.



Yellow Bay Journal

University of Montana Biological Station

Yellow Bay, Montana. 99911

JANUARY 1985

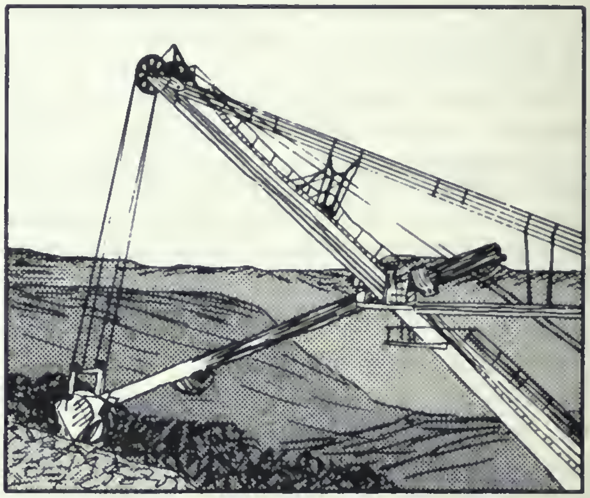
News from the Biological Station for all those who care

Research could lead to control

Tracking phosphorus in lake

Industrial Effluents: Burlington Northern Tie Treatment Site

The Burlington Northern Railroad tie treatment plant is located in the town of Somers, 15 miles south of Kalispell. For more than 40 years, process water containing creosote was discharged into a holding pond and overflow from the pond was channeled into a pond adjacent to Flathead Lake. After 1971, Burlington Northern (BN) built lagoons to collect the process water, and no longer used the holding pond. In 1984, BN curtailed the use of the lagoons in favor of a closed-loop system that recycles process water back through the treatment process.



Currently the lagoons are being cleaned by BN under the supervision of the state Solid Waste Management Bureau. Although no immediate threat to human health has been established, creosote contains suspected carcinogenic (cancer-causing) compounds. The Somers site has been added to the EPA's list of Superfund hazardous waste sites because of its proximity to Flathead Lake, from which the Somers water supply is drawn. As a consequence, the EPA has taken the lead in the cleanup.

The process involved in cleaning the contaminated area will be slow, difficult and expensive. The first step involves a thorough study using test wells, sampling and other monitoring procedures. BN has hired technical consultants to perform field investigations and analyses. Approximately 50 percent of the baseline data has been collected and the rest should be collected in the next six months. As a temporary remedial measure, BN has constructed a dike that will protect lake waters from eroding the edges of the pond. BN has also agreed to remove the upper five feet of waste material from the pond.

Nonpoint Source Pollution

Controversy continues over assessing the relative shares of naturally occurring phosphorus compared to the phosphorus coming from sewage effluent. Some studies conclude that between half and three-fourths of the total phosphorus deposited annually in Flathead Lake comes from natural events such as sediments transported by rain and snow-melt runoff, stream-bank erosion and air-borne particulates (EPA, 1984).

Nonpoint source pollution is diffuse. Assigning responsibility by source is subjective because measurement is difficult and expensive. One can speak of categories of land use, development and management practices that influence runoff and phosphorus inputs to Flathead Lake. Logging activities, farming techniques, commercial and residential development, highway construction and recreational development—including ski slopes—pose different types of challenges to pollution abatement.

Forest Management

Forestry practices and other activities on forest land have a direct bearing on Flathead Lake's water quality. Road building and logging are suspected of contributing a significant amount of phosphorus-containing sediments to the watershed. The number of additional road miles built and timber acres harvested, their location and reclamation procedures determine the extent of adverse impacts to water quality. Logging and road building on the forest have occurred for 100 years; there is no background data available on the basin's water quality before these activities took place. Without this background data, the impacts from forest management actions cannot be easily determined.

U.S. Forest Service lands cover nearly 50 percent of the Flathead basin. The state of Montana has three major land holdings within the basin—the Stillwater, Coal Creek and Swan River State Forests. Numerous mile-square tracts, which were created as school trust sections, are also scattered throughout the basin. The Confederated Salish and Kootenai Tribes manage their own timber land. Burlington Northern Timberlands, Inc. owns over 274,000 acres of forested land many of which are situated in a checkerboard pattern with national forest lands west of Kalispell and in the Swan River Valley. Champion International and Stoltz Land and Lumber forest product corporations are other significant owners of forest land.

Mining and Drilling

Both federal and state lands are leased for oil and gas development. Currently, the Flathead Forest has 612 oil and gas leases on 1,166,846 acres of forest land. There are also four mining claims in the Flathead's wilderness areas (Conrad, 1985). Two of these claims are expected to be relinquished soon, and the other two are inactive. None of the 612 oil and gas leases are active, but results from an exploratory ARCO well located west of Kalispell showed strong evidence of an extensive productive field in the Flathead region.

A recent 9th U.S. Circuit Court of Appeals decision has stayed all activity on these leases. Judge Hatfield held that the cumulative impacts of several oil and gas activities (which if considered singly might not constitute a significant impact to the environment) had to be evaluated in the Environmental Impact Statement (EIS) process. The oil and gas industry has appealed this decision and, if it proves successful, the prospect for extensive oil and gas development on federal lands in the basin is high.

One exploratory oil drilling operation on state land has been approved—the Cenex Corp.'s proposal on the Coal Creek State Forest in the North Fork of the Flathead River drainage in the vicinity of Glacier Park. The Department of State Lands concluded in a Preliminary Environmental Review (PER) that, with certain stipulations, the exploratory well would not significantly affect the area's environment. Should the well prove successful to the point that extensive production facilities and multiple wells are required, the department would require an Environmental Impact Statement that would contain further siting and environmental safeguards.

Environmental groups have sharply criticized the department's philosophy. Several have brought suit, claiming that 1) a full EIS is necessary prior to exploratory drilling, and 2) even if required, mitigation efforts to safeguard the environment will not be adequate to maintain the North Fork's pristine nature.

The CoCa Mine's Hog Heaven silver mine project near Niarada in southwest Flathead County has received Department of State Lands permit approval. The project plans to supply its water needs from groundwater underlying a state section some five miles to the south of the mine and within the boundaries of the Flathead Reservation. Hydrologic and legal problems associated with the use of this water source are the subject of proposed cooperative agreements among the tribes, the state, and CoCa Mines. Because of a currently unfavorable silver market, the mine is not now in operation.

Agricultural Practices

The nature and extent of the agricultural nonpoint source problem is directly related to the way in which the land is used. The agricultural sector generally manages land resources intensively. Overgrazing of range and pasture land contributes sediment and nutrient pollution through runoff. The related surface disruption and reduction of natural cover increases the erodability of these lands. And, grazing can compact and damage streambanks, thus increasing erosion and sedimentation problems.

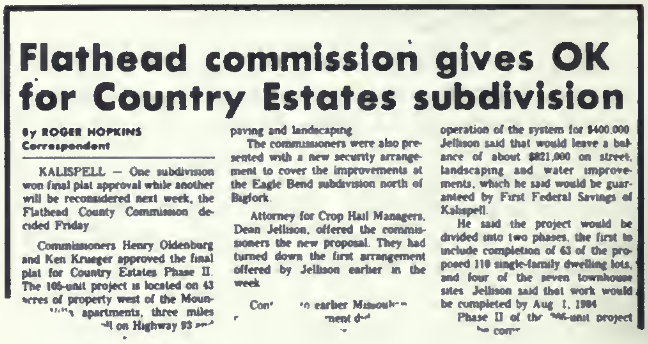
Although agriculture presents pervasive nonpoint source pollution problems, the best management practices (BMPs) available for addressing agricultural nonpoint sources generally are well known. In addition, many of the problems can be ameliorated by adoption of BMPs consistent with the economic self-interest of the landowner or farmer. In fact, management practices designed to stop erosion (the movement of soil and associated pollutants from the land) may also increase the long-term productivity of the land.

Irrigation can present runoff problems. For example, there is controversy on the Flathead Reservation over the operation of the Flathead Irrigation and Power Project (FIP), a Bureau of Indian Affairs entity. The FIP provides both irrigation water and electric power to users on the reservation. The Tribes have attempted to bring the FIP into compliance with the National Environmental Policy Act (NEPA) and have encouraged the drafting and implementing of a written operational plan for the FIP's irrigation division that would limit drastic water flow manipulation, foster water conservation, and minimize water pollution.

Land-Use Development

The development of commercial and residential property increases nonpoint source pollution. Erosion, septic systems located in porous soils and runoff from impervious surfaces (including paved areas and house roofs) are all associated with development. Because of the Flathead's attractive setting and its location as a commercial center, the pressure to subdivide and build on agricultural or undeveloped lands is great. Agricultural land will be lost to development as long as the demand for building tracts continues. Since 1960, 15 percent or 8,862 acres of prime soils in Flathead County have been divided into parcels of 20 acres or smaller. This does not include 15,000 acres of prime soils previously developed.

The location and construction of highways also affects water quality. Impervious surfaces and inadequate vegetation on slopes can accelerate erosion. Disturbed areas, however, can be protected by ground vegetation and impervious surface runoff can be channeled through infiltration pits or sediment collection ponds. Department of Highway contract procedures require seeding of barrow pits, slopes and shoulders but do not provide for treatment of impervious surface runoff.



Flathead commission gives OK for Country Estates subdivision

By ROGER HOPKINS
Correspondent

KALISPELL — One subdivision won final plat approval while another will be reconsidered next week, the Flathead County Commission decided Friday.

Commissioners Henry Oldenburg and Ken Krueger approved the final plat for Country Estates Phase II. The 105-unit project is located on 43 acres of property west of the Moun- [illegible] apartments, three miles [illegible] on Highway 93 and paving and landscaping.

The commissioners were also presented with a new security arrangement to cover the improvements at the Eagle Bend subdivision north of Bigfork.

Attorney for Crop Hail Managers, Dean Jellison, offered the commissioners the new proposal. They had turned down the first arrangement offered by Jellison earlier in the week.

Con[illegible] to earlier Missoula [illegible] operation of the system for $400,000. Jellison said that would leave a balance of about $821,000 on street, landscaping and water improvements, which he said would be guaranteed by First Federal Savings of Kalispell.

He said the project would be divided into two phases, the first to include completion of 63 of the proposed 110 single-family dwelling lots, and four of the seven townhouse sites. Jellison said that work would be completed by Aug. 1, 1984.

Phase II of the [illegible]-unit project [illegible]

Lake Mary Ronan: Grazing and Logging

Lake Mary Ronan deserves special emphasis because it drains into Flathead Lake and demonstrates a similar nutrient-loading problem. Located eight miles northwest of Dayton, Lake Mary Ronan provides recreation opportunities for second-home dwellers and anglers. A Department of Fish, Wildlife and Parks lake classification study of northwestern Montana categorized Lake Mary Ronan as a eutrophic lake (Domrose 1974). The lake was characterized by low levels of dissolved oxygen, high temperatures, murky, turbid waters, and abundant algal growth. Large mats of filamentous blue-green algae were observed floating throughout the entire lake during the late summer and early fall.

These conditions were attributed to excessive phosphorus loading from both upstream and lakeshore activities; an estimated 98.7 percent came from nonpoint sources. Freeland Creek, Donaldson Creek and other tributaries accounted for the nonpoint sources, while lakeside septic systems and precipitation accounted for the remaining point sources of phosphorus. The annual total phosphorus coming into the lake was 1,120 kg. The annual total phosphorus leaving the Ronan Creek outlet was 490 kg., leaving a net annual accumulation of 630 kg.

The lake is in Lake County but the drainage overlaps Flathead and Lake counties. The U.S. Forest Service, Montana state forest lands and private tracts make up the land ownership. Intensive clear-cut logging in the late 1960s and overgrazing by domestic stock probably accelerated the eutrophication rate.

A feasibility study was conducted to determine alternative methods of lake restoration (Morrison-Maierle, 1976). The study concluded that fencing was the most economically feasible method of reducing the nutrient loading. Burlington Northern, which owns about 75% of the lakeshore frontage, agreed to fence the entire lake and open up spring areas for watering cattle in the upper drainage away from stream courses. Completed in 1980, the project demonstrates cooperation between a land resource manager—Burlington Northern—and state agencies. Unfortunately, little follow-up monitoring has been conducted so the success of BN's efforts to limit nutrients to Lake Mary Ronan is uncertain.

Swift Creek: Runoff Problems

Swift Creek is the major tributary of Whitefish Lake. It contributes phosphorus through the extensive erosion of unconsolidated glacio-fluvial sediments (clay banks). Bank erosion is at its peak during high runoff from mid-May to mid-June. Because Whitefish Lake feeds into Flathead Lake, nutrient loading problems to Swift Creek are a concern to the entire Flathead basin.

Although it is a natural occurrence, clay bank erosion is increased by human activities. Swift Creek runs through portions of the Stillwater State Forest, where extensive timber sales and road building activities have occurred. Large timber cuts, the lack of vegetative buffering of the stream, soil disturbance and intrusion on stream channels can increase runoff, erosion, sedimentation, and remove filtering areas. As a result, Swift Creek has experienced increased stream flow, velocity, temperature and turbidity.

Sediment yields have been measured on Swift Creek for several years. Based on measurements taken from the 10-mile stretch between Concrete Bridge and Crain's Ranch, it is estimated that erosion from this section contributes 100 to 125 tons of sediment per surface acre per year. This portion of Swift Creek passes through the majority of the clay banks. Measurements taken above the clay bank section of Swift Creek, where most logging activity takes place, showed sediment levels within the range expected for natural conditions.

Efforts to control the natural erosion of Swift Creek's clay banks might be considered. Vegetation of the banks could reduce sediment yields up to 20 percent, but this will be difficult because of slope wash, slumping, inaccessibility and the high density of the bank material. Structural measures for erosion control are possible but not very practical because of the extent of the eroding banks. Nearly the entire lower 10 miles of Swift Creek would have to be channeled, along with extensive slope stabilization for many of the banks, for the effort to be effective. The cost of these structural measures could be prohibitive.

Whitefish River: Dispersed Pollution

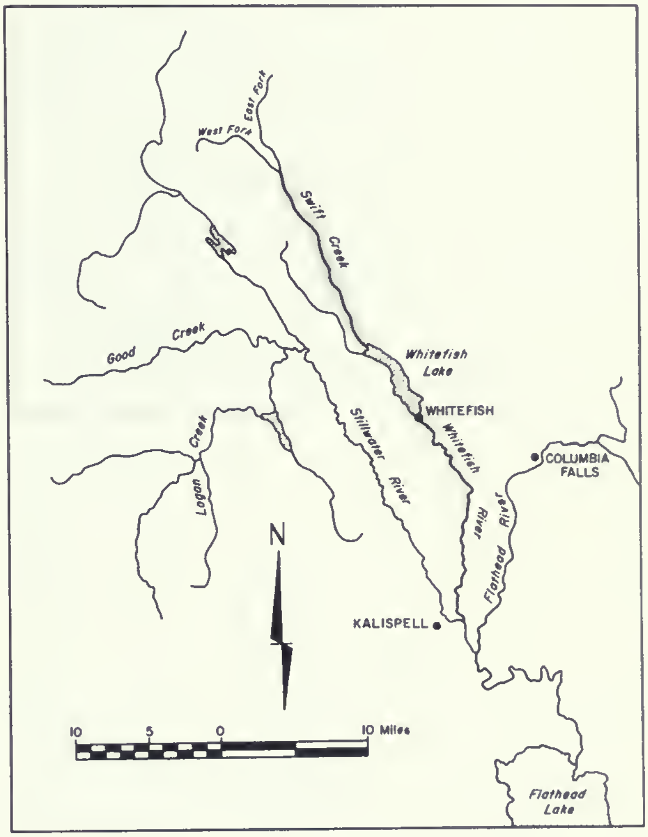
Unlike the natural erosion problem on Swift Creek, nutrient additions in the Whitefish River stem from a variety of land-use activities. The Whitefish River flows from Whitefish Lake to a point near Kalispell where it joins the Stillwater River prior to entering the Flathead River. Channel alterations, extensive livestock grazing, car bodies used for riprap, irrigation takeoffs and debris, including sunken refrigerators, characterize much of the 24-mile length of the river.

Water quality in the Whitefish River is generally considered good with respect to fish and wildlife productivity. Recent studies, however, have revealed alarmingly high levels of coliform bacteria and phosphorus concentrations (Whitefish River Natural Resource Inventory, 1985). The studies have linked these unnaturally high levels primarily to the Whitefish Sewage Treatment Plant (soon to be upgraded) and eroding river banks. It has not been determined if the coliform is of human origin or from other warm-blooded animals, including cattle.

Most of the increased phosphorus has been attributed to erosion caused by livestock grazing too close to the river banks. Other causes include urban-area construction and other agricultural activities adjacent to the river's edge. The studies showed that 71 percent of the phosphorus-yielding sediments came from these sources. Additional monitoring will be required to attribute the phosphorus contributions by both point and nonpoint sources of pollution.

The majority of the streambank erosion problems could be alleviated by land-use practices: proper grazing usage on lands adjacent to the river, off-stream livestock watering sites, revegetation of denuded areas, protective vegetative strips between agricultural areas and the river's edge, and fencing.

Existing federal, state and local agencies have the appropriate authority to control the land-use activities affecting the Whitefish River and other water bodies. Assistance to landowners for appropriate corrective action should be the responsibility of these agencies. That improper land use practices continue to pollute the Whitefish River is evidence that agency coordination and authority is not being carried out.



Giardia Lamblia Concerns

An increased awareness of water quality issues by the basin's citizens is evidenced by a growing concern for Giardia lamblia. Recent water samples collected in the Hellroaring watershed (a water-supply source for Polson) and Whitefish Lake contained Giardia lamblia cysts, a protozoan that can infect the human intestinal tract.

Despite widespread publicity, some water quality experts do not feel that Giardia lamblia poses a greater threat than in the past; rather, intensified monitoring efforts are documenting levels of Giardia lamblia that have always been there. To date, no correlation has been made between the Flathead basin's decreased water quality and appearances of the Giardia lamblia cyst. A danger may exist, however, and the FBC encourages continued vigilance for any changes in the frequency of appearance.

Note: in the preceding discussion, illustrations of both point source and nonpoint source problems in the Flathead basin are provided. Not all of the specific manifestations of water quality deterioration in the Flathead basin can be addressed in this report and an omission should not be taken as lack of concern by the commission. Likewise, the attention given to a particular instance is not meant as a special indictment. The sample of problems discussed is meant only to suggest the range and variety of pollution concerns that must be faced in the Flathead basin.

Water Quality Measures

Maintaining or restoring water quality must be addressed at several levels: technical, economic and regulatory. At the technical level, monitoring is necessary to help determine the sources of nutrient inputs to the basin water systems. At the economic level, the costs of preventing or abating pollution must be ascertained. At the regulatory level, the inefficiencies resulting from multiple, overlapping jurisdictions need to be corrected. First and foremost among these is the up-to-date information base that water quality monitoring provides.

Water Quality Monitoring

Water quality in the Flathead basin has been researched extensively and a "baseline" firmly established. People may disagree about the value of still further "studies" but few can doubt the need to develop a program to document the present status of water quality in the principal water bodies of the Flathead basin. Without a monitoring program, it will be impossible to establish trends in water quality. The Flathead Basin Commission has worked with the Flathead Lake Biological Station (FLBS) to organize a water quality monitoring master plan, based on priorities established by FRBEIS studies. The plan encompasses monitoring responsibilities by the entities with management or regulatory duties in the basin: the Bureau of Reclamation, the U.S. Geological Survey, the Montana Department of Fish, Wildlife and Parks, Montana Department of Health and Environmental Sciences, Glacier National Park, Flathead National Forest, the Confederated Salish and Kootenai Tribes, the Montana Department of State Lands, Lake County, Flathead County and private corporations. The FLBS is funded to carry out some of the monitoring duties on Flathead Lake (see appendix E).

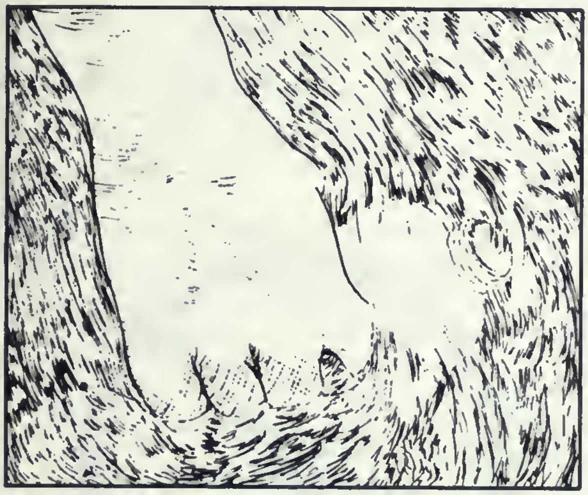
The master plan identifies the several types of monitoring required—hydrological (discharge), physical (temperature, substrate composition), chemical (phosphorus, nitrate levels), and biological (limnological and fisheries); the sites on the river and its tributaries; and, the allocation of monitoring responsibilities among the agencies. The master plan specifically details the locations, parameters and frequency for monitoring. Full plan implementation requires 13 agencies to monitor 17 water quality parameters at 79 locations up to 16 times a year. Sites were chosen to provide a cross section of the basin water systems. The premise of the monitoring program is that the basin waters need to be monitored for at least 10 years in order to document changes (improvement or degradation) in water quality.

The agencies assigned specific tasks in the water quality monitoring program collect data primarily to evaluate their own program effectiveness with respect to water. All agencies will report results annually to the commission. The commission's role is to identify the areas that need to be monitored and assign responsibilities in order to avoid duplication of effort. The master plan specifies the methodology so that data are comparable.

Funding of the monitoring master plan, to guarantee its full implementation, remains unresolved. The estimated cost of full adherence to the plan is about $550,000 per year. The master plan provides alternatives for lower levels of monitoring under funding constraints. Reduced levels of monitoring, however, will result in gaps in the data base and extend the uncertainties over the nature and source of nutrients that the master plan was designed to identify.

Several agencies, especially the Forest Service, face budget constraints that could prevent them from performing the level of monitoring designated in the master plan. The duties in the master plan for the Flathead Forest would cost about $227,000 per year, but historically the Forest Service has only received about $70,000 annually for monitoring. The Montana Department of Fish, Wildlife and Parks, and DHES's Water Quality Bureau also suffered cuts in their monitoring budgets. In addition, because of uncertainty over the federal budget, federal agencies such as the USGS and the EPA also may face budget restrictions. The total annual commitment of funds for the monitoring plan could be as low as $150,000. A major effort is being undertaken by FBC members to encourage agencies to fund their portion of the plan at the maximum level possible.

Under Montana's Constitution and laws, public agencies have the authority to enter into intergovernmental agreements for the purpose of providing any service or performing any function that they can perform individually. In a step toward funding the master plan, the commission recommended that six public and private parties sign a joint agreement for water quality monitoring of the Flathead Lake portion of the master plan.



Without a monitoring program, it will be impossible to establish trends in water quality.

Restricting Phosphorus Input

Even in the absence of complete monitoring information, enough is known about nutrient loading to be able to call for certain restrictions on activities that contribute phosphorus. It is estimated that 20 tons of phosphorus comes from sewage treatment plants and of that amount at least four tons is attributable to detergents. Fewer than one-third of the residents of Lake and Flathead counties are connected to sewage treatment plants. An additional four tons of phosphorus per year may come from the use of detergents in outlying areas (Phosphorus Strategy, 1984).

One method of control is to remove concentrations of organic phosphorus through sewage treatment plants. Another is to restrict the use of commercial products containing phosphorus through regulation of the sale of phosphate detergents. Each approach has different economic and regulatory implications.

Sewage Treatment

In April 1984, the DHES Water Quality Bureau announced a strategy for limiting phosphorus loading to Flathead Lake. The strategy recommends that municipal sewage treatment plants be required to limit the phosphorus discharges to 1.0 mg/l, in order to reduce the total contribution by 17 tons per year. This recommendation is being implemented by revising the waste discharge permits of the four upstream municipal treatment plants (Kalispell, Whitefish, Columbia Falls, and Bigfork).

Upgrading the four treatment facilities will be expensive. A summary of the cost estimates for each community to achieve the 1.0 mg/l total phosphorus standard is presented in appendix J. Total construction cost estimates for the four municipalities is $2,351,400. In addition to construction costs, annual operations and maintenance also come with a substantial price tag to the communities.

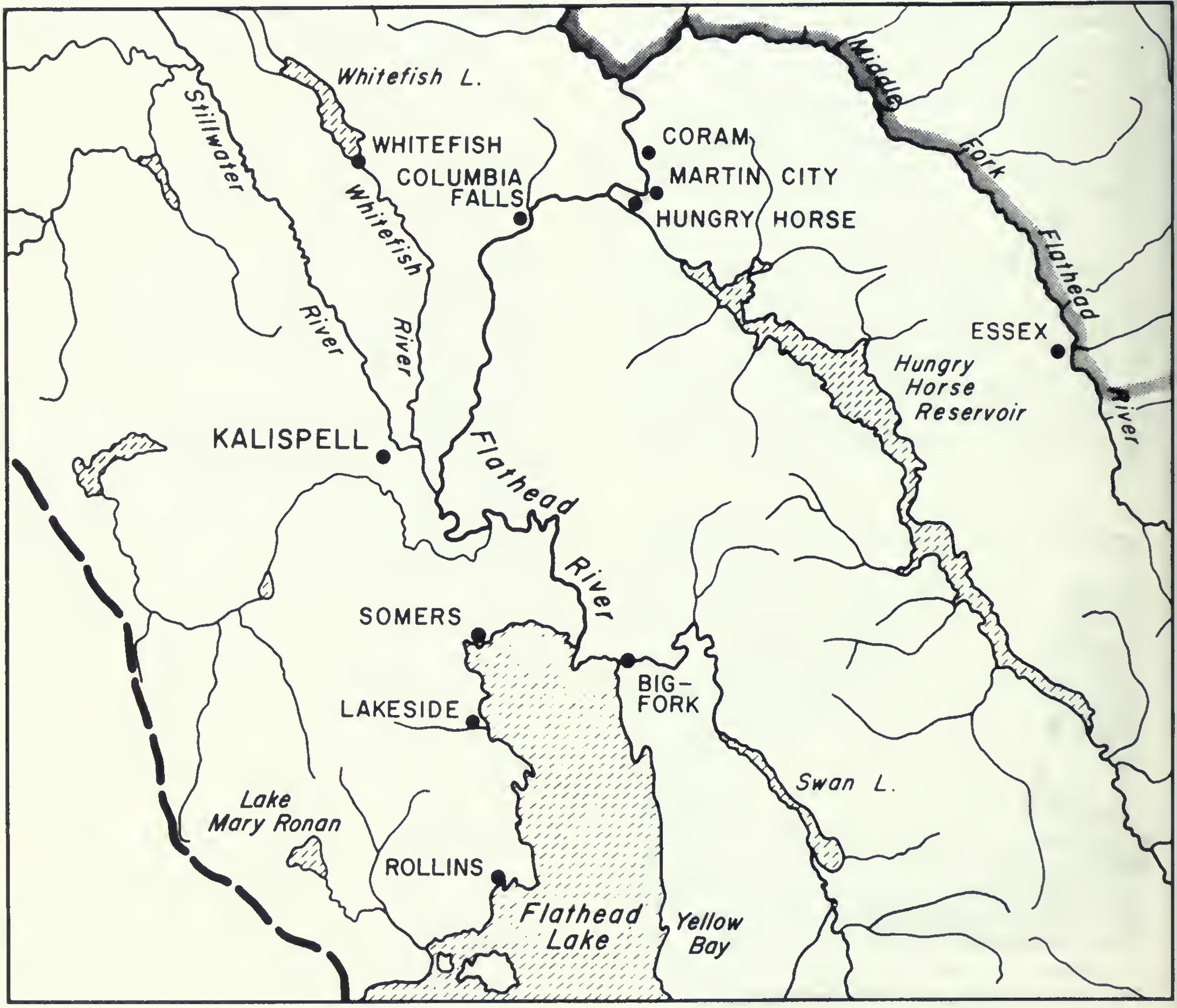
EPA grants are contingent on the communities providing their share of the costs (currently either 15 percent or 25 percent). These matching funds still must be approved by city officials, county commissioners and by the voters. The projects are competing with other essential local services and approval cannot be assumed. The Flathead Basin Commission has and will continue to encourage local officials to secure funding to continue these upgrades.

The Ashley Creek sewage disposal problem is the most complex in the Flathead basin. If no action is taken, Kalispell will be found in violation of state and federal clean water standards. Many Kalispell residents, however, question the importance of upgrading Ashley Creek. Characterized as a slough-type stream below the treatment plant, it has never been known for its fishing or recreational value. Conversely, other area residents recognize the importance of limiting the nutrient loading in the lake's tributaries. In order to gain support for what will most likely be an expensive solution, Kalispell residents must be convinced of the importance of the Ashley Creek problem in the larger context of its relationship to Flathead Lake (DHES, Ashley Creek PER, 1985).

The city of Whitefish and the Whitefish Water and Sewer District (WWSD) continue to try to raise funds to address septic system problems. A proposal to identify the nature and source of nutrients in Haskill Basin and Whitefish Lake and to determine measures necessary to maintain water quality and quantity needs was recently denied funding by the DNRC Water Development Program. A similar WWSD funding request for a study to determine individual nutrient sources, including individual septic systems, and for a study of treatment alternatives was denied by the 1985 Legislature (see appendix J).

The Whitefish Water and Sewer District has hired an engineer to verify Whitefish Lake's failing septic systems and to develop alternatives for more effective sewage disposal. Possible solutions could involve central sewage collection, new individual septic systems or other alternatives. Most solutions will qualify for EPA funding.

The importance of upgraded municipal treatment plants to the health of the Flathead basin cannot be overstated. The financial loss to the local economy because of a deteriorating lake would be far greater than the cost of upgrading facilities. If approved today, upgraded wastewater treatment plants probably would not be operational until 1987.



The importance of upgraded municipal treatment plants to the health of the Flathead basin cannot be overstated.

The County Option Phosphorus Product Restriction

Approximately 10 percent of the biologically available phosphorus entering Flathead Lake may come from phosphorus detergents (Stanford, 1985). This percentage, although small, is significant because of the lake's "threshold" status. As little as a one-half percent decrease in phosphorus input annually may be enough to prevent problem algae growth in coming years.

The 1985 session of the Montana Legislature passed HB 711 (see appendix L) that gives Montana counties with natural lakes the option of adopting model phosphorus cleaning-compound rules. Agricultural (fertilizer) activities, hospitals, nursing homes, and commercial and industrial operations are exempt from the restriction, as are the use of hand soaps, other personal care items and dishwasher detergents. Before adoption, a county must demonstrate that complementary phosphorus removal efforts are being made. These efforts could include setback requirements for shoreline buildings, stringent requirements for individual septic systems, upgrading central collection systems to tertiary treatment, and designing agricultural and logging practices to limit erosion.

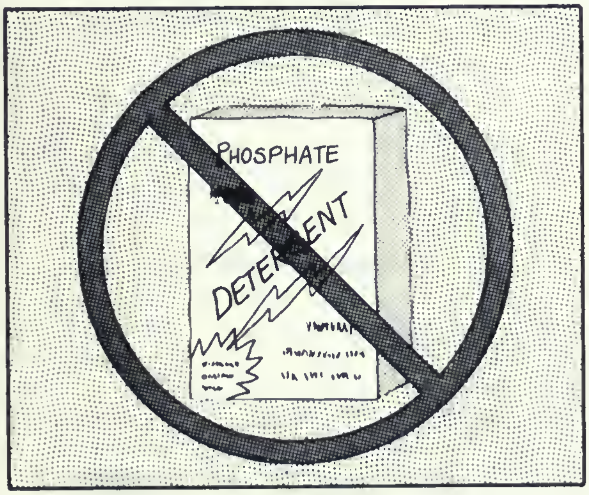
Counties may restrict only the sale of phosphorus products; the use of phosphorus products would not be penalized. If a store in a ban county offers a phosphorus detergent for sale, the county must notify the store of its violation. If, after 30 days from notification, the store has not taken the product off its shelf, the store is subject to a misdemeanor penalty.

Proponents of the phosphorus restriction have stressed that its imposition would not be onerous. Consumer availability is not limited; retailers currently stock both phosphorus and phosphorus-free detergents. (A few of the common brands of phosphorus-free detergents are White King, All, Purex, Dynamo, Woolite and Sun, and many name-brand powdered detergents are also now being marketed in a non-phosphorus liquid form.) Retailers serving both ban and non-ban counties can easily stock their trucks at the warehouse to handle store orders.

Some people believe that phosphorus-free detergents cost more because people using these products will use additional hot water to clean their clothes. This is not necessarily so: phosphorus-free detergents have greatly improved in recent years and many people now prefer them to phosphorus detergents. Tests at the Montana State University Microbiology Department have shown that phosphorus detergents do not remove more bacteria than phosphorus-free detergents; water temperature is the major factor responsible for killing bacteria. Phosphorus is used primarily to soften water, but it is only one of several water softening agents available to detergent manufacturers.

Six other states currently have phosphorus detergent limitations: Indiana, Michigan, Minnesota, Wisconsin, Vermont and New York. In addition, local ordinances limit phosphorus detergents in Chicago, Miami, Akron, Ohio, two resort communities in Maine, and five resort communities in New Hampshire. All Canadian provinces have phosphorus detergent limitations.

Soap and detergent industry spokespersons raised several objections in the debate over HB 711. They argued that a phosphorus product ban will not reduce nutrients enough to change the lake's trophic status. They also argued that phosphorus can be removed most cost effectively at sewage treatment plants. Proponents partially conceded this second point but argued that upgrading basin sewage treatment plants to this capability will take years; action is needed now. The Department of Health and Environmental Sciences must promulgate rules by July 1986. Then, the next step is for Flathead and Lake counties to adopt and implement these rules.



Phosphorus is the limiting nutrient in Flathead Lake: the amount of phosphorus that is "biologically available" as food determines plant productivity.

About 100 tons of biologically active phosphorus enter Flathead Lake each year.

The Trade-offs

The introduction of phosphorus into the waters of the Flathead basin cannot be stopped but it can be slowed. The Flathead Basin Commission recognizes that phosphorus is ubiquitous: it is introduced from activities throughout the basin. Urban, rural, suburban, industrial, commercial, residential, agricultural, resource development and other activities all contribute phosphorus. The commission also recognizes that the most obvious aspects of water degradation may not always be the most significant.

Informed people continue to debate the relative merits of the different approaches to restricting phosphorus. Some people feel that they are being asked to shoulder a disproportionate share of the responsibility for halting the infiltration of phosphorus. Community residents, burdened with costly sewer system improvements, are especially concerned. That is why the FBC supports the combination of upgrading sewage plants and restricting sales of phosphorus products. The effective restriction of phosphorus product use could result in a savings of $60,000 to $100,000 a year to the four municipal plants in the Flathead basin (Water Quality Bureau, 1984).

The FBC will continue to explore the best balance of policies to limit phosphorus loading, but the health of the lake cannot await the collection of complete information on all phosphorus sources. If the phosphorus product ban and wastewater treatment plant improvements are found to be insufficient, then the commission may have to recommend additional controls that address more diffuse development. The FBC will continue to be open to recommendations from area residents regarding additional measures that can effectively and equitably balance the burden for controlling phosphorus.

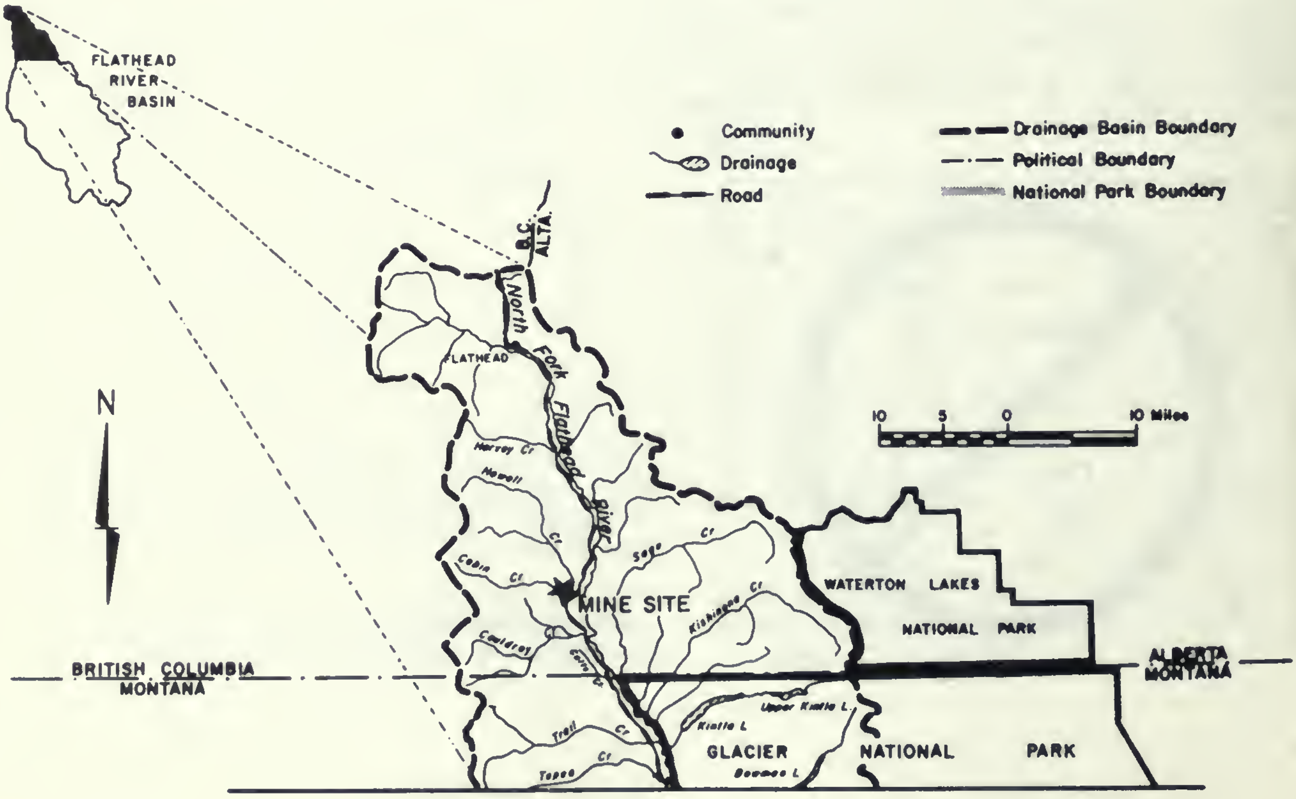
Liaison with Complementary Projects

The Flathead basin is part of the international Columbia River drainage system. Because other activities in the Flathead basin and in adjacent jurisdictions will affect the work of the Flathead Basin Commission, it has taken note of important work on complementary projects: the Cabin Creek reference before the International Joint Commission, the fish and wildlife restoration program of the Northwest Power Planning Council, the Flathead Forest Plan, the Montana Governor's Office Clark Fork Project, and local economic development planning. The commission will continue to evaluate ways to attain mutual objectives with these related projects.

Cabin Creek

The construction and operation of Sage Creek Coal Company's proposed Cabin Creek coal mine in southeastern British Columbia could threaten the water quality in Montana's portion of the Flathead basin. The mine is proposed to be built near tributaries of the North Fork of the Flathead just a few miles from the U.S.-Canada border and the boundary of Glacier National Park. In 1984, the British Columbia government gave Stage II approval (approval-in-principle) to the mine; a currently slack coal market has kept the mine sponsors from seeking the Stage III permits necessary to begin construction.

Montana's concerns regarding the Cabin Creek proposal are documented in information and arguments that can be found in the Flathead River Basin EIS, state agency records, technical critiques of the mine plan, information exchanges with British Columbia, and letters



between the governor and the B.C. premier from 1976 and 1983. Several concerns related to water resources were not resolved, from Montana's point of view, through these information exchanges:

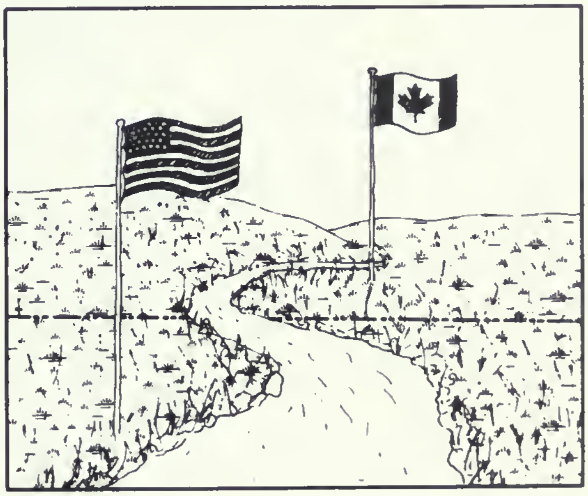
- questions and problems on drainage ditch and sediment pond design and location at the mine site;
- the absence of any analysis of possible depletion, flow reduction, or dewatering of Howell and Cabin Creeks by the proposed mining operation;
- the possibility of acid drainage, nutrient metal and sediment enrichment of downstream waters because of discharges from the mine;
- the British Columbia limit of 50 mg/l of suspended sediment in discharge waters from the mine site is of concern to Montana, which recommended that the limit be lowered to 15 mg/l;
- containment of extensive clay overburden;
- the need for further evaluation of the effects of water quality and quantity impacts on aquatic biota (insects and bull trout in the Flathead basin);
- the problems associated with long-term maintenance of the sediment control system at the mine site and the need for a comprehensive hydrologic monitoring program in the vicinity of the mine;
- impacts on fisheries and wildlife are not known and detailed information on the mine's reclamation plans is lacking; and
- possible problems of coal burning and fugitive dust.

In 1982 and 1983, Montana raised these points in extensive comments on Sage Creek Coal Company's Stage II mine application to the B.C. government. British Columbia's position is that it, and the government of Canada, are as committed to ensuring that the project proceeds in an environmentally responsible manner as any of the American individuals or agencies who have expressed views on the project. The B.C. system of guidelines governing the development of coal mines is thorough and systematic and the B.C. government has made a point of encouraging input into that process from interested parties outside its jurisdiction. As a result of this input, in particular from the state of Montana, the B.C. government imposed stringent conditions in its approval-in-principle decision to protect downstream water quality.

Throughout the lengthy information exchange on the Sage Creek project, B.C. officials have emphasized the fact that the province's regulatory system differs from the U.S. model, especially in terms of the order in which various aspects of project proposals are dealt with. In the B.C. view, this procedural difference in no way reduces the effectiveness of the review. While, in Montana's view, the reclamation plans at Stage II are inadequate, the B.C. position is that a detailed reclamation plan must be submitted for provincial agency approval at Stage III, where careful assessment of reclamation plans and other mine-site control structures to protect downstream water quality is an important aspect of B.C.'s staged guidelines.

With the agreement of the British Columbia and Canadian governments, the Cabin Creek issue will be studied by the International Joint Commission (IJC), a bilateral body of the two countries that has successfully resolved many transboundary water disputes since its inception in 1909. On April 18, 1985, the International Joint Commission established a six-person Flathead River International Study Board to undertake, through appropriate agencies and individuals in the United States and Canada, the investigations requested by the commission. The study is to be completed within 18 months. Investigations to be undertaken by the board are described in appendix I.

Technical committees have been formed to assist the board in investigating the various problems presented by the mine (for example, adequacy of the reclamation plan, water quality impacts to the Flathead River and impacts to fisheries. Experts from state and federal agencies, the Montana University System and the Flathead Basin Commission have been asked to serve on these technical committees. The investigative board has developed a detailed work plan. Public hearings on the work plan were held in July 1985 in both Kalispell, Montana, and Fernie, British Columbia.



Although the recommendation of the IJC is not binding on either Canada or the U.S., the prestige of this international tribunal is a great influence on both U.S. and Canadian public opinion and officials. This study may afford Montana the chance to insist on the strictest standards of control over the mine operation and its effluents. The Cabin Creek dialogue has been elevated from the state-province level to the one of two sovereign nations. This does not mean, however, that the people of the Flathead basin will lose their voice in negotiations. The FBC has encouraged the state to make a vigorous and effective presentation of Montana's case before this international tribunal. It supported a legislative appropriation and assigned $5,000 from its budget for this purpose. The FBC will work through appropriate state agencies in this endeavor and will comment directly on the reference study work plan and provide information as needed by the International Joint Commission.

Fish and Wildlife Restoration Program

The Northwest Power Planning Act of 1980 requires that fish and wildlife considerations be balanced with hydropower benefits in the Columbia basin. The Bonneville Power Administration has the major responsibility for implementing measures to enhance fish habitat under the Columbia Basin Fish and Wildlife Program. The goals of this program are to (1) identify impacts on the fish and wildlife resource from hydropower development, and (2) recommend a set of mitigation alternatives that include reservoir management, restoration of spawning grounds, fish ladders around dams or increased hatchery production. Most important, offices have been established with authority to call for a specified amount of water during the year from upstream dams (a water budget) in order to flush anadromous fish smolt back to the sea.

The BPA has contracted the services of the DFWP to determine how Hungry Horse Dam operations impact fish and wildlife, and has similarly contracted with the DFWP and the Confederated Salish and Kootenai Tribes to make the same determination with respect to Kerr Dam. The BPA is currently funding six fish and three wildlife studies by the DFWP and one fish and one wildlife study by the tribes. In addition, the U.S. Forest Service is working with the DFWP on related projects.

Agencies, including the DFWP and the tribes, that participate in this research under BPA funding are mandated by the Northwest Power Planning and Conservation Act and BPA policy to coordinate their efforts so that the Columbia basin river system can be managed as a unit and so that interagency friction over competing interests can be minimized.

A central concern of the studies is the coordination of releases between Hungry Horse Dam and Kerr Dam and the effect on the Flathead River flow and the fluctuating level of water in Flathead Lake. Hungry Horse and Kerr Dams are operated in accordance with the Pacific Northwest Coordination Agreement that governs operation of all dams in the Columbia River system. Coordination of the dam flows under the agreement attempts to optimize the production of energy in the Columbia River system. The multiple-use benefits of each dam, where they have been recognized, are integrated into this system approach for the overall benefit of the Pacific Northwest. Multiple-use features of the dams include flood control, power generation, irrigation, navigation, fish and wildlife considerations, and recreation.

For the Flathead River flow below Hungry Horse Dam, the DFWP has recommended a flow of 3,500-4,500 cubic feet per second (cfs) between October 15 and December 15, with a year-round minimum of 3,500 cfs. These flows are necessary for the recovery of the river spawning segment of the Flathead kokanee population (kokanee comprise about 90 percent of all fish harvested in the Flathead Lake-River system) and to provide a stable environment for other game fish species and invertebrates. These flows return the river hydrograph to a pattern much closer to the natural one, a change from recent operations. The Bureau of Reclamation, operators of Hungry Horse Dam, have agreed to the flow recommendation.

A second focus is flow release from Kerr Dam. In the past, the regulation of Kerr Dam to maximize power production has created wave action on Flathead Lake that has noted effects: streambank erosion at Creston, periodically flooded lands close to shallow areas of the lake, boat-owner complaints about lake levels, and damage to fish-spawning grounds. As a part of the Federal Energy Regulatory Commission's relicensing process, and because the project is located on an Indian reservation, the Secretary of the Interior can set flow release parameters on project operations to protect fish and wildlife resources. These conditions become part of the license itself. The secretary has deferred formalizing these conditions pending completion of the BPA fish and wildlife studies and other research being conducted by the Bureau of Indian Affairs.

The wisdom of cooperation among resource management entities is demonstrated in the potential conflicts that could develop as measures to mitigate the impacts of flow fluctuations from the two dams in the Flathead basin are implemented. For example, flow regimes to enhance kokanee spawning in Flathead Lake and the upper Flathead system could possibly conflict with flow regimes recommended to enhance spawning of trout and pike in the lower Flathead system. Second, dam outflows altered to protect and enhance spawning grounds and other aspects of fish and wildlife life cycles could contribute increased amounts of phosphorus-yielding sediments to Flathead Lake. Third, flow regimes designed to protect and enhance fish, wildlife and recreation may reduce the federal and private utility's ability to meet projected power demands, especially during winter. Finally, in the larger picture of the Columbia basin, the interests of the Flathead basin could conflict with those of entities downstream; the water budget flow releases could adversely impact flow regimes established to benefit Flathead basin resources.

All of these potentially competing interests must be balanced in the establishment of flow regimes in the Flathead and in the larger Columbia basin systems. Coordination and cooperation among affected entities, from the research to the implementation stages, is therefore essential. The Flathead Basin Commission, because of its broad representation, is in a position to monitor the ways in which the various interests are balanced.

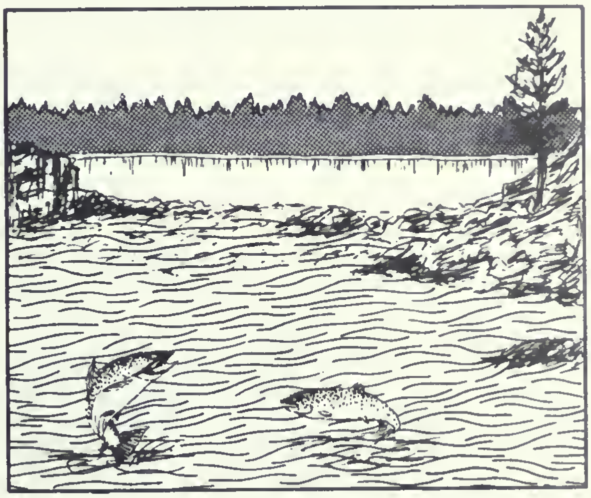
Micro-hydro Development

Part of the concern for fisheries in the Flathead basin extends to the possible impacts of micro-hydro development. These projects are usually proposed for smaller streams with steep gradients. Some resource managers are concerned about the effects of small hydro projects on aquatic resources. Diversion of water from the natural stream channel is the greatest concern of fisheries biologists. Such diversions can decrease flows in a mile or more of a stream channel to levels below those needed to support healthy fish populations and aquatic insects. Dewatering can also eliminate crucial spawning areas. Diversion structures often restrict fish movements, a key concern because the trout populations of many lakes and rivers depend on adult fish migrating upstream to spawn in small tributaries and on juvenile fish moving downstream to restock the larger waters. Diversion structures can also jeopardize water quality by acting as sediment traps that must be flushed periodically.

Fisheries biologists are also concerned about the cumulative impacts of many small-scale hydro developments in a single drainage. In a study in the Swan drainage (DFWP, 1984), biologists are assessing how development of the 20 proposed small-scale hydro projects would affect the migratory fishery of trophy bull trout. Preliminary analysis indicates that development of many small-scale hydro sites, along with the increased sedimentation from anticipated timber harvest, could significantly reduce bull trout populations in the Swan Lake-Swan River complex.

Another consideration is the effect of hydropower developments on Montana's already complicated water rights situation. Instream flow is the primary water right concern with respect to diversions in mountainous areas. Before the required federal license can be issued for a project, state biologists recommend the amount of water that must remain instream, rather than being diverted for the hydro project. This bypass flow must be inviolate to protect fisheries; however, there is currently no tested legal mechanism, either federal or state, for guarding this flow against future consumptive withdrawals.

FERC has been criticized for showing little consideration for state concerns over water rights, and the federal agency's sensitivity to environmental concerns has often been questioned. Additionally, FERC issues permits and licenses without regard to any overall siting plan. Many officials in Montana have questioned whether small-scale hydro is a legitimate federal interest, and some interstate governmental organizations are supporting congressional initiatives to transfer control of small-scale hydro from FERC to the states.



The Flathead Irrigation and Power Project (FIP) power division provides power to the Flathead Indian Reservation from purchases from BPA and from a low-cost block of power from Kerr Dam allocated to the FIP by the original Kerr license. The FIP is not directly involved in developing additional sources of power on the reservation, although it does operate a small high-head generating facility on Hellroaring Creek east of Polson. This facility was built in the early 1900s and purchased by the FIP several decades ago.

The Flathead Basin Commission is the logical entity to take an interest in the integration of small-scale hydro development with the NWPPC fish and wildlife restoration plan and its two-year Northwest Rivers Study. To date, FERC has not addressed small-scale hydro proposals within the context of the NWPPC's electricity plan or its associated fish and wildlife restoration plan (EQC, 1985). FERC's failure to abide by these plans could reduce the effectiveness of the Northwest Power Planning Council's efforts to restore fishery and wildlife resources lost because of past hydropower development in the region.

Flathead National Forest Plan

The Flathead National Forest has issued a draft and supplemental Forest Management Plan that proposes management direction for the next five decades. Extensive input from federal, state and local agencies and from industries, organizations and individuals was used in developing and refining the proposed plan. The approved Forest Management Plan should be released to the public in the fall of 1985.

The plan sets management direction to maintain basic land productivity while proposing to provide a range of products and resources to the public, including:

- providing a variety of recreation opportunities (in wilderness, roadless and roaded settings);
- maintaining or enhancing wildlife habitat (for nongame, big game and threatened and endangered species);
- providing wood products (100 million board feet (MMBF) of timber per year during the first decade, increasing to 125 MMBF per year by the third decade);
- constructing only those additional roads needed to meet management requirements (by the end of the fifth decade all areas will be fully accessed); and
- maintaining high water quality in streams originating in the forest to protect migratory and resident fisheries, water-based recreation opportunities, and public water supplies.

The Forest Service will use a sediment prediction model (developed by specialists in hydrology, soil science and fish biology) for certain roads and timber sales in critical fishery streams to estimate the impacts from management activities. Water and sediment yield calculations have been made on the most important bull trout fishery streams in the Swan River drainage during 1983 and 1984. Similar yield calculations will be started in the drainages of the North Fork of the Flathead River in 1985. The Forest Service will eventually investigate and calculate water and sediment yield for all important fishery and other important streams throughout the forest. Because slope, aspect, elevation, age of timber stands, stream gradient and soil types vary from drainage to drainage, each of these factors will be used to characterize drainages. Until yield calculations are completed for particular drainages, the general model will be used to predict sediment loading in a drainage based on specific proposed timber sales and road miles.

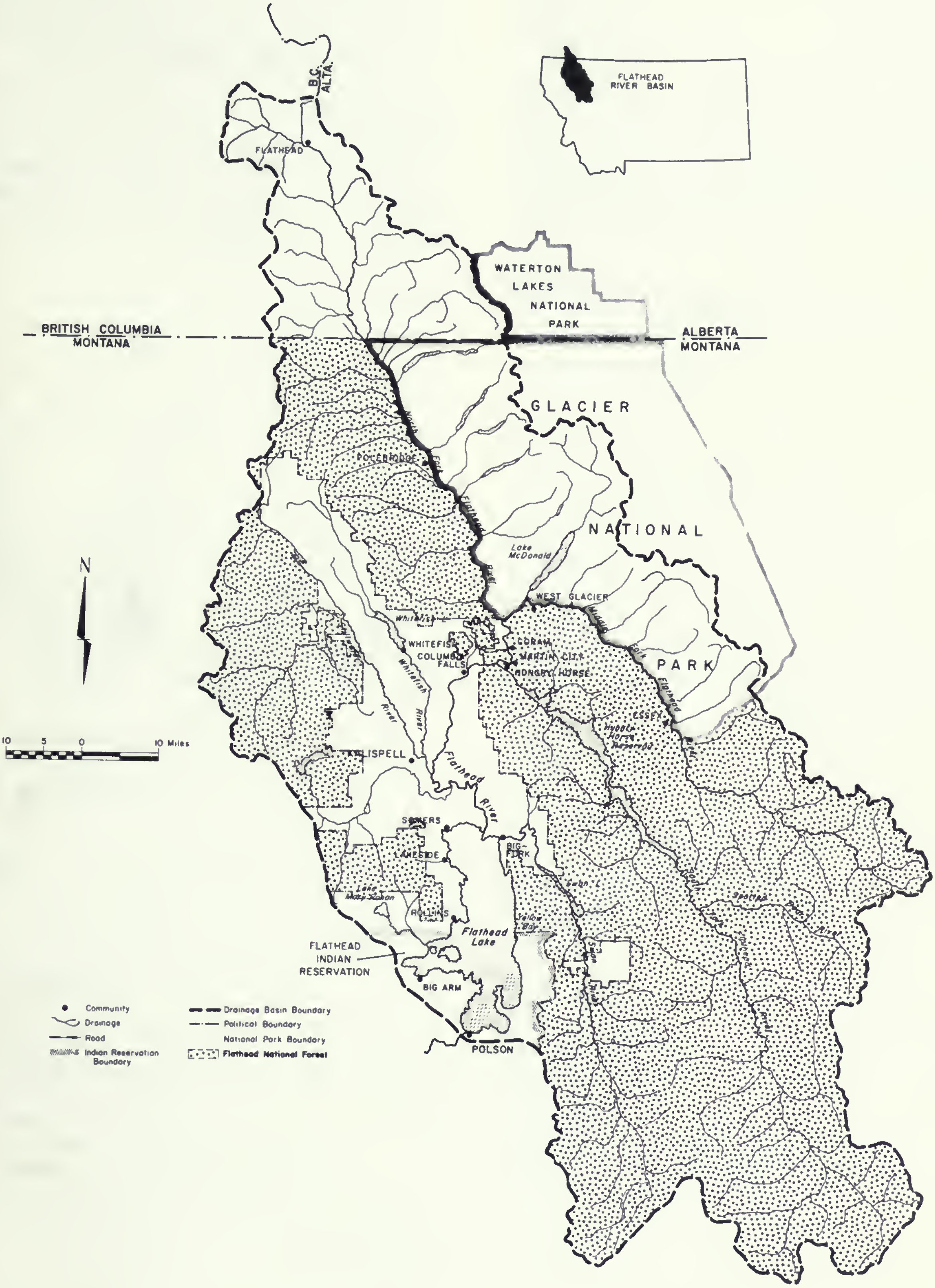
Monitoring is an important part of the forest plan. Limits and effects of outputs are specified in the monitoring plan. If the limits are exceeded, the activity causing the impact will be altered or stopped. Water flow, sediment yield (suspended and bed load), and streambed sediment levels will be the characteristics measured to determine the impact of forest management activities on water quality and spawning gravels. The effectiveness of measures or practices performed to minimize impacts will also be monitored. If additional funding beyond what has traditionally been allocated becomes available for the Flathead National Forest, chemical analysis may be made by the Forest Service as outlined in the Flathead Basin Master Monitoring Plan.

The level of monitoring in the Flathead Forest typifies the nature of the monitoring problem in the Flathead basin. The Forest Service is aware of the need for monitoring to evaluate the impact of its activities on water quality. Without adequate funding for individual drainage investigations, however, potential problems cannot be fully addressed.

The Forest Service has tentatively committed funding for the annual collection of water quality samples at 15 sites in the forest. In addition, fish habitat monitoring will occur at 14 sites (USFS, April 1985; Flathead National Forest). While the locations of such monitoring are consistent with those set forth in the Flathead Basin Water Quality Master Plan (see appendix E), the number of water quality parameters measured at each site and the total number of monitoring sites are significantly lower than those attributed to the USFS in the Master Plan. Flathead National Forest monitoring emphasizes the measurement of total suspended sediments and fish habitat conditions while deemphasizing chemical analysis of water quality.

The Flathead Basin Commission is concerned with these omissions and will encourage the USFS to devote additional funding for water quality monitoring in the Flathead National Forest in order that the Master Plan can be fully implemented. It should be noted that the National Park Service has agreed to fund nearly 100 percent of the monitoring called for in the Master Plan.

During the public comment period for the proposed forest management plan, the Forest Service received comments concerning the ability of the forest to maintain existing water quality levels in streams and lakes with implementation of the proposed harvest levels. Central to these public concerns were 1) a potential increase in sedimentation and water quality degradation as the result of proposed roads and other forest management activities in riparian and other sensitive areas, 2) a deficient sediment yield modelling effort, and 3) uncertainty regarding the availability of necessary funds for future monitoring activities on the Flathead National Forest. The Forest Service will address these concerns with the issuance of the final forest management plan.


FLATHEAD
RIVER BASIN
B.C.
ALTA.
FLATHEAD
WATERTON
LAKES
NATIONAL
PARK
BRITISH COLUMBIA
MONTANA
ALBERTA
MONTANA
GLACIER
NATIONAL
PARK
POLEBRIDGE
North Fork Flathead River
Lake McDonald
WEST GLACIER
Middle Fork Flathead River
Whitefish L.
WHITEFISH
COLUMBIA FALLS
CORAM
MARTIN CITY
HUNGRY HORSE
ESSEX
Hungry Horse Reservoir
Whitefish River
Stillwater River
Flathead River
KALISPELL
SOMERS
LAKESIDE
BIG-FORK
Swan L.
Lake Mary Ronan
ROLLINS
Yellow Bay
Flathead Lake
FLATHEAD
INDIAN
RESERVATION
BIG ARM
POLSON
South Fork
Spotted Bear River
N
10 5 0 10 Miles
Community
Drainage
Road
Indian Reservation Boundary
Drainage Basin Boundary
Political Boundary
National Park Boundary
Flathead National Forest

Related Forest Management

The state forest management plans must be considered as well. Annual harvest occurs on 1,500-2,000 acres of the 128,900 total acres of the Stillwater and Swan River State Forests. Approximately half of the acres are clear-cuts and half are some type of partial cutting. The timber sales are accessed by 15 miles of new or temporarily improved roads annually. According to the current timber sale plan, harvests on state lands within the Flathead basin would average about 21.3 million board feet per year. Starting July 1, 1986, this amount could increase to almost 27 MMBF. These figures reflect about a 6 MMBF increase and are the result of state legislative action to obtain more revenue.

The Confederated Salish and Kootenai Tribal Council has directed the Forestry Branch of the Flathead Agency, BIA, to begin managing tribal forests according to a multiple-use concept. This policy will give additional protection to resource values other than timber harvest, most importantly watersheds on the reservation.

The Clark Fork River Basin Project

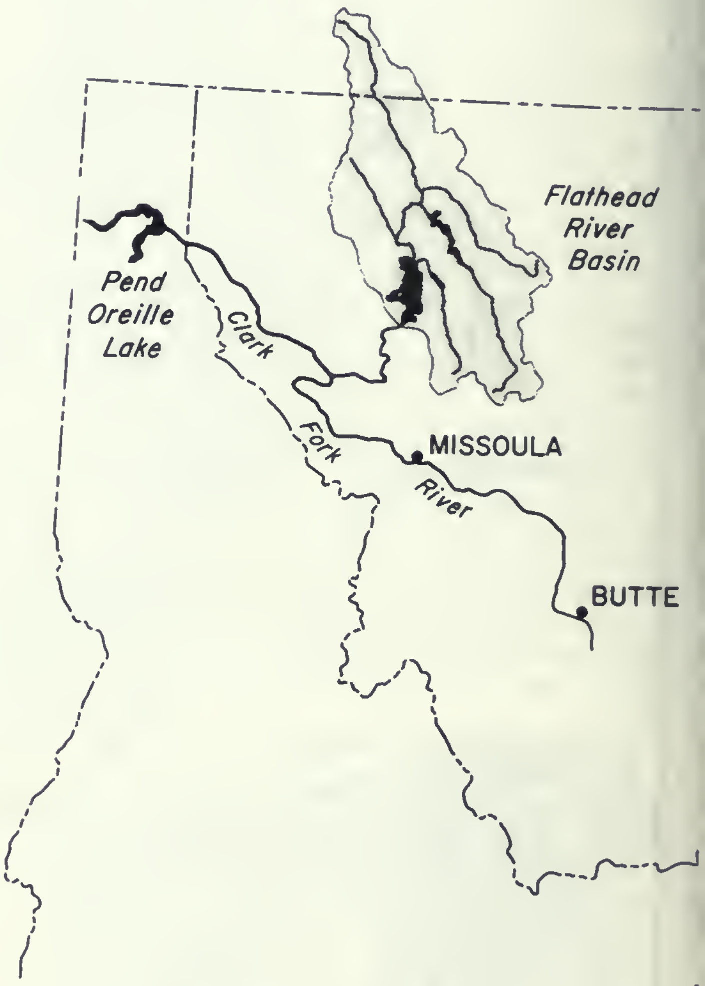
The Clark Fork River arises in the Pintler Mountains near Butte and Anaconda. It receives the waters of the Blackfoot, Bitteroot and Flathead rivers before departing Montana near the community of Heron. The Clark Fork River is vital to the well being of western Montana. The river is a key resource for industrial, recreational and municipal activity and is a cornerstone of western Montana beauty. The Clark Fork River, however, like the Flathead, suffers from varying degrees of stress. Mining and smelting activity, stream modification, forest practices, hydroelectric dams, industrial effluents and sewage discharges all contribute to the Clark Fork's problems.

The scientific community, concerned agencies and citizens have responded to these problems by recently initiating over 30 pollution-related investigations and clean up activities involving the Clark Fork. These range from Superfund investigations in the river's headwaters area near Butte to limnological studies in Idaho's Lake Pend d'Oreille. Recently a project was initiated within the Governor's Office to coordinate these activities and to identify where additional information is most urgently needed if the health of the Clark Fork is to be improved.

The principal objective of the Clark Fork Project is to provide administrative continuity to past, current and planned water-related studies within the basin and to identify where additional information is most urgently needed. The project will coordinate findings from studies associated with pulp mill and municipal discharges, and evaluate mining permits, water reservation applications, Superfund projects, abandoned-mine land reclamation projects, water quality and water flow stations, and other monitoring activities being conducted by governmental agencies, industry or by units of the Montana University System. This coordination will minimized duplication and efficiently utilize the conservative budgets allocated for agency water studies. Technical guidance for the project is provided by an interagency and intrastate task force of state, federal and university scientists. Project direction is provided by state natural resource agency directors, the Environmental Quality Council and a citizen's advisory committee.

The project's final document will include a comprehensive data base for the river, will identify major water-related problems within the basin, and will provide a framework for their resolution. The report will provide state, federal and local decision makers with an array of water quality management choices.

Because the Flathead River is a major tributary of the Clark Fork (providing over 50 percent of the Clark Fork's flow below its confluence with the Flathead), the efforts of the Clark Fork River Basin Project and the Flathead Basin Project are inexorably linked. This linkage is reinforced by having administrative responsibility for both projects located in the Governor's Office.



Economic Development Planning

For more than a decade, there has been a heated debate in Montana over growth versus preservation. Montanans search for the high ground of balanced development—growth that builds on but does not detract from the state's ample resource base. Nowhere is the problem of achieving this balance more critical than in the Flathead basin. Resource development has brought economic prosperity but it also threatens the permanence of that prosperity. Basin residents must strike a balance between appreciating the recreational opportunities of the region's renewable resources and utilizing its non-renewable resources.

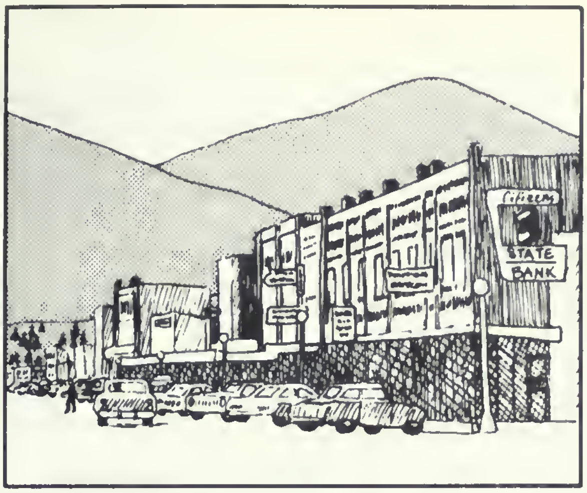
The Flathead Valley is a trading center for a large geographic area of western Montana and southern Canada. The population of Flathead, Lake, Lincoln and Sanders counties is approaching 100,000. Continued growth in the region is expected, but at a slower pace than the 32 percent increase during the 1970s. Commerce is the most rapidly growing employment sector in the Flathead basin. The diversified economic base of the basin includes the wood products industry (as the largest base employer), tourism, primary metals, retail trade, government, transportation and other manufacturing.

Federal and state programs provide incentives for local groups to formulate economic development committees and corporations. Under the auspices of recent state government "Build Montana" programs, there is a renewed search for ways to attract investment capital, to promote the export of Montana products, to upgrade and fabricate commodities from local resources, to prove up technologies for demonstration and development, and to attract tourists. In the Flathead basin several community and chamber of commerce economic development groups have been formed.

An "Overall Economic Development Plan" for Flathead County recently has been adopted and Lake County is in the process of revising a similar plan. Flathead County's plan acknowledges the vulnerability of the wood products and mining industries to uncertain world markets and it recommends diversification toward clean, light industries. This diversification would reduce the water quality impact of the traditional major industries. The national competition for clean industry, however, is fierce and efforts to bring it to the Flathead Valley may be difficult.

The Flathead Economic Development Plan notes that agriculture continues to languish. Faced with poor crop revenues, an unfavorable tax structure, and developers willing to pay a price higher than present agricultural value, farmers will continue to sell prime lands. Clearly, officials need to address more closely the trade-offs involving subdivision and land-development pressures versus long-term agricultural productivity.

These local economic development planning groups have little trouble attracting widespread community participation in the analysis of alternatives to promote new economic activity. The level of interest is high because everyone has a stake in the health of the local economy and because the plan generating process recognizes that good ideas usually come from ordinary citizens. There is widespread, eager, sustained participation among individuals in the Flathead basin trying to keep their futures within their control.



The future of the Flathead lies in economic growth that does not compromise water quality; a stable economy can continue only if water quality is preserved.

The FBC intends to formally interact with these economic development groups for several reasons. First, the commission is specifically charged with encouraging economic development without compromising the high quality of the Flathead basin's aquatic environment. Second, the commission needs to generate the same kind of enthusiasm and widespread participation in the consideration of water quality uses that just as directly affect the long-term health of the regional economy. Third, the commission cannot afford to find itself at cross-purposes with these groups because the planning processes have transpired in mutual isolation.

Because of its obligation to monitor resource utilization trends, the FBC might propose collaboration with the economic development committees to develop a more comprehensive view of the basin's economic profile. The case of monitoring forest planning activities illustrates how economic growth and environmental protection must be considered together. Forest products have been a mainstay of the basin's economy but continued harvest practices imply sedimentation levels that the aquatic environment may not be able to accept. The wood products industry presses for more and cheaper leases to keep the trucks moving and the mills in business; the Forest Service and State Lands have agency rationales that tend to maintain current or expanded harvest levels. It may be appropriate to explore more ways to upgrade or fabricate wood products locally, instead of relying on the expectation of forest cut levels that cannot be sustained.

The Agenda: Confirming Responsibilities

There are different views on the principal function of the Flathead Basin Commission, owing largely to the many individuals who sit on the commission and the wide range of matters it has been asked to address. Some people view the commission as an umbrella over the many agencies with direct legal mandates in the basin; by bringing them all together it ensures mutual awareness of complementary duties. Other people view the commission as a barometer of trends in the basin and see its function as faithfully reporting changes in water quality or patterns of development that could threaten water quality. Still others stress the spotlight function of the FBC; its responsibility to direct attention to proposed management practices that warrant full public discussion of their implications for the basin's healthful environment. The perception of function will sharpen with time and with feedback from area residents on the job the commission is doing.

The commission has been given a sizeable responsibility but only a modest arsenal to attack the problems. It possesses neither the financial resources nor the regulatory sanctions to guarantee the balanced growth and development that is necessary to preserve the high level of water quality.

The law creating the FBC gave it no regulatory authority per se. That regulatory authority is already assigned to many agencies at several layers of government. The purpose of the FBC is not to supercede these agencies but to enhance the use of existing authority to protect the basin's aquatic environment. This task entails promoting communication among several agencies that may have complementary permitting or supervisory authority over different aspects of a single project. It also means acting as a referee to promote consensus in cases where these agency authorities under the law may be found to overlap or even be contradictory. It may mean pointing out gaps in existing mandates—where a problem may fall into cracks between agency jurisdictions—and making recommendations to the legislature to address omissions. It certainly means representing to the public an image that one entity is taking a cohesive overview of the multiple water quality issues in the basin; citizens can become frustrated when dealing with the many layers of government and the apparent proliferation of agencies to handle development issues.

Many of the issues discussed in this first biennial report illustrate the need to coordinate agency regulation. A good example is the clean up of the BN creosote pollution at Somers. The Flathead County government has responsibilities under the Shoreline Protection Act; the Water Quality Bureau is responsible for enforcement of the state's implementation of nondegradation laws; and, the Environmental Protection Agency is responsible for designation of Superfund status for cleanup assistance. This is the ideal situation for FBC involvement; to focus public attention on the degree of seriousness of the problem and to ensure that all regulatory parties interact regularly.

The Flathead Basin Commission's strength lies in the scope of its membership and the quality of the interaction of members; its vulnerability lies in the delicate balance it must maintain between pointing out problems and "pointing-the-finger." To be successful, the commission must integrate the activities of its members into a binding plan of action.

Montanans search for the high ground of balanced development—growth that builds on but does not detract from the state's ample resource base.

There is a symbiotic relationship between the FBC and all of its agency members. Each agency, through its representation on the commission, can use the commission agenda to explain to the public its specific duties and authority in a particular problem area. The commission, in turn, relies on the individual agencies for the regulatory mandate, the staff expertise and the financial resources to address problems of control or clean up that are warranted following commission examination and recommendations. However, it is also the responsibility of the commission to give citizens the opportunity to question agency officials who sit on the commission about the particular use of that agency's authority—such as the regulation of a stream bed alteration or the imposition of sanitary restrictions in a subdivision.

As the Flathead Basin Commission enters its second biennium, it is appropriate to reaffirm its philosophy of procedure. The FBC, by means of public meetings and hearings, will actively pursue and solicit from all interested people their concerns regarding Flathead Lake and the quality of water in the entire basin. The commission will listen, entertain all points of view and document each significant water or land-use problem that is raised.

The commission will define problem issues, establish jurisdictional responsibilities, and evaluate the ability of the responsible entity or agency to resolve the problem. It will determine whether or not the agency or party has the means, tools, law, policy approval, budget, administrative skill and willingness necessary to attend to the situation. And finally, the commission will arrange all possible cooperative assistance by virtue of its mandate to appeal, contact, seek and prevail upon other agencies or parties for assistance to get the job done. It will raise these issues in the media in order to focus public attention on the documented deficiencies.

The FBC will continue its practice of holding frequent meetings in different communities in the basin. It is also initiating a Speakers' Bureau to promote citizen consensus. Commission members will speak to any interested area group on the issues facing the basin. Composed of public and private members collectively familiar with virtually all basin issues, the commission can use the Speakers' Bureau outreach capability to ascertain, evaluate and, ultimately, express citizen concerns.

In order to enhance relations with state agencies in Helena, the executive director designated by the Governor's Office must be provided space and office assistance in Kalispell and Polson. The commission recommends that the executive director devote a minimum of two days per month at each station.

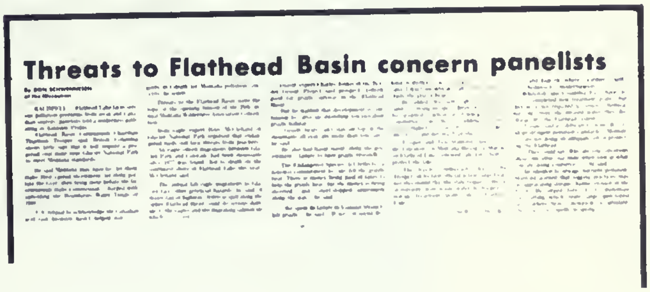
Water Quality Monitoring

Water quality monitoring will continue to be the number one priority. This biennial report has described the complex water quality problems facing the Flathead basin. Natural processes like spring runoff contribute heavily to Flathead Lake's nutrient loads. But the nutrient additions of human-related activities greatly accelerate Flathead Lake's aging process. Calculating impacts and assigning responsibility will require continuous monitoring and evaluation. Comprehensive data collection will help identify the nature and extent of nutrient additions from the various land-management practices in the basin.

Determination of the threshold status of the lake depends on the execution of the monitoring master plan. Monitoring will allow for continual reinforcement of the idea that Flathead Lake is on the threshold of losing its oligotrophic status. Evidence from the Flathead Lake Biological Station indicates that even small additional increments of phosphorus will induce increasingly frequent occurrences of algal blooms. The salience of monitoring efforts will help to remind Flathead basin residents that individual efforts to control phosphorus additions to the lake are beneficial.

Adequately funding the master plan remains the commission's first objective. Because it is unrealistic to assume that the federal, state and local agencies' budgets for monitoring will be fully funded at the requested level, the commission must explore other funding options. The importance of adequate funding for the Flathead Forest's portion of the master water quality monitoring plan cannot be overstated. The Flathead Basin Commission must reinforce the Flathead Forest's efforts, if necessary, with appeals to the Montana congressional delegation.

The FBC and residents of the Flathead basin have long depended on the Flathead Lake Biological Station at Yellow Bay for expertise on lake-related matters. The station staff has produced extensive studies that lend increasing scientific and public insight into the nature and extent of the lake's water quality problems. The station staff organized the master water quality monitoring plan. The Flathead Basin Commission will continue to work closely with the station and support the station's requests for adequate funding to carry out its research and monitoring functions.



Threats to Flathead Basin concern panelists

Evaluating Economic Development

The commission operates from the premise that all land-use activities ultimately become considerations of water quality. The commission's mandate is to encourage actors in the basin to agree on standards of resource utilization and management that are comparable from agency to agency.

The commission has initiated a project to document the major development activities in the basin, agency by agency. Commission members are responsible for keeping the activity file current for responsibilities of their agency. This inventory will be used to compile information on existing management standards. The microprocessor file is available for review at the Office of the Governor. Once the nature of activities and management practices has been compiled the next step for the commission is to work towards adopting comparable development standards for the many agencies making decisions about the basin's future. At this stage of review, particular activities may warrant closer scrutiny—subdivision growth and land use practices, for example.

Flathead Lake represents what economists refer to as a case of common property. People want to share its benefits but tend to avoid taking individual responsibility for paying to preserve the integrity of the system that provides these benefits. The single-minded pursuit of economic self-interest may result in what ecologist Garrett Hardin calls the "tragedy of the commons." People tend not to restrain their own actions when they see that no one else is making the same effort. The answer to preserving resources held in common lies in mutual restraint.

The Flathead Basin Commission ultimately must provide the mechanism for mutual restraint among all the entities and agencies that promote or sanction growth. That is the purpose of its mandate to seek comparable development standards for all agencies. Public agencies and private parties alike must share in the process of tempering unbridled growth appetites. Controversy over the equitable sharing of the costs of environmental enhancement is certain to grow. People will naturally resent what they might consider to be a denial of certain opportunities for economic gain from their development plans.

The commission perhaps will find itself in the middle of heated debate over fundamental values. It is up to the commission to acknowledge that resolution of water quality problems in the Flathead basin ultimately will necessitate trade-offs. The future of the Flathead lies in economic growth that does not compromise water quality; a stable economy can continue only if water quality is preserved.

The commission operates from the premise that all land-use activities ultimately become considerations of water quality.

Appendices

Appendix A: List of FBC members

Appendix B: Text of law creating the FBC

Appendix C: Accounting of monies received and spent

Appendix D: Meeting activities and actions taken

Appendix E: Water Quality Monitoring Master Plan

Appendix F: Glossary

Appendix G: Bibliography

Appendix H: List of legal citations

Appendix I: Text of the International Joint Commission Directive to the Flathead River Basin International Study Board

Appendix J: List of EPA/DNRC water system grants

Appendix K: Text of HB 711, Phosphate Ban

APPENDIX A

Flathead Basin Commission Members
August 15, 1985

Elwin E. Bennington, Acting Chairman
P.O. Box 1039
Polson, Montana 59860

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Richard Taylor
U.S. Bureau of Reclamation
Hungry Horse Project
Hungry Horse, Montana 59919

APPENDIX B

Part 3

Flathead Basin Commission

75-7-301. Short title. This part may be cited as the "Flathead Basin Commission Act of 1983".
History: En. Sec. 1, Ch. 424, L. 1983.

75-7-302. Purpose. The purpose of the Flathead basin commission is to protect the existing high quality of the Flathead Lake aquatic environment; the waters that flow into, out of, or are tributary to the lake; and the natural resources and environment of the Flathead basin.
History: En. Sec. 2, Ch. 424, L. 1983.

75-7-303. Definitions. As used in this part, the following definitions apply:

(1) "Aquatic resources" means all beneficial uses of water, including but not limited to water quality and water supply; recreational, scenic, and aesthetic values; and fish, wildlife, and other organisms.

(2) "Commission" means the Flathead basin commission established in 2-15-213.

(3) "Flathead basin" means all land and water areas the water from which drains into Flathead Lake or its tributaries.
History: En. Sec. 3, Ch. 424, L. 1983.

75-7-304. Duties of the commission. Duties of the commission are:

(1) to monitor the existing condition of natural resources in the basin and coordinate development of an annual monitoring plan. This plan must involve a cooperative strategy among all land and water management agencies within the Flathead basin and identify proposed and needed monitoring which emphasizes but is not limited to the aquatic resources of the Flathead basin.

(2) to encourage close cooperation and coordination between federal, state, provincial, tribal, and local resource managers for establishment of compatible resource development standards, comprehensive monitoring, and data collection and interpretation;

(3) to encourage and work for international cooperation and coordination between the state of Montana and the Province of British Columbia concerning the undertaking of natural resource monitoring and use of consistent standards for management of resource development activities throughout the North Fork Flathead River drainage portion of the Flathead basin;

(4) to encourage economic development and use of the basin's resources to their fullest extent without compromising the present high quality of the Flathead basin's aquatic environment;

(5) to, in the discretion of the commission, undertake investigations of resource utilization and hold public hearings concerning the condition of Flathead Lake and Flathead basin;

(6) to submit a biennial report to the governor and the appropriate committees of the legislature that includes:

(a) a summary of information gathered in fulfillment of its duties under this section;

(b) information on monitoring activities within the Flathead basin concerning the condition of the basin's natural resources, with particular emphasis on Flathead Lake;

(c) the identification of land use and land development trends in the Flathead basin;

(d) any recommendations the commission considers appropriate for fulfillment of its duties and for continued preservation of the Flathead basin in the present high quality of its aquatic resources; and

(e) an accounting of all money received and expended, by source and purpose, for the period since the last report; and

(7) to meet at least semiannually within the Flathead basin, alternating the meeting site between the cities of Kalispell and Polson.
History: En. Sec. 7, Ch. 424, L. 1983.

75-7-305. Commission authority. (1) The commission may make recommendations to the legislature and the governor and to federal, tribal, provincial, and local agencies for maintenance and enhancement of the quality of natural resources of the Flathead basin.

(2) Subject to appropriation by the legislature, the commission may receive and expend donations, gifts, grants, and other money necessary to fulfill its duties.
History: En. Sec. 8, Ch. 424, L. 1983.

75-7-306. Establishment of account. There is established in an other special revenue fund a Flathead basin commission account. Money received by the Flathead basin commission under 75-7-305 and such other funds as are designated or appropriated for its use must be deposited in the account.
History: En. Sec. 9, Ch. 424, L. 1983; amd. Sec. 48, Ch. 281, L. 1983.

Compiler's Comments
1983 Amendment Substituted "an other special revenue fund" for "the federal and private revenue fund".

75-7-307. Special county government authority. The governing body of any county within or bordering upon the Flathead basin may allocate to the Flathead basin commission a portion of any money available from coal severance tax allocations or other sources and designated for planning activities.
History: En. Sec. 10, Ch. 424, L. 1983.

75-7-308. Cooperation with other agencies and organizations. To fulfill its duties, the commission shall develop and maintain cooperative programs with federal, state, provincial, tribal, and local agencies or organizations that are responsible for natural resource management and monitoring in the Flathead basin. Participating federal and provincial agencies must be requested to provide adequate funds to participate on the commission and to monitor resources within their areas of responsibility.
History: En. Sec. 11, Ch. 424, L. 1983.

CHAPTER NO. 95

[HB 258]

AN ACT TO ADD AS AN EX OFFICIO MEMBER OF THE FLATHEAD BASIN COMMISSION THE DIRECTOR OF THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES OR HIS DESIGNEE; AMENDING SECTION 2-15-213, MCA.

Be it enacted by the Legislature of the State of Montana:

Section 1. Section 2-15-213, MCA, is amended to read:

"**2-15-213. Flathead basin commission — membership — compensation.** (1) There is a Flathead basin commission.

(2) The commission consists of *16* members selected as follows:

(a) four members appointed by the governor from industrial, environmental, and other groups affected by Title 75, chapter 7, part 3, one of whom must be on the governor's staff and who also serves as the executive director;

(b) one member who shall be the commissioner of state lands or his designee;

(c) one member appointed by the Flathead County commissioners;

(d) one member appointed by the Lake County commissioners;

(e) one member appointed by the Confederated Salish and Kootenai Tribes;

(f) one member appointed by the United States department of agriculture, forest service regional forester for the northern region;

(g) one member appointed by the United States department of interior national park service, regional director for the Rocky Mountain region;

(h) five ex officio members appointed respectively by the chief executive of the provincial government of the Province of British Columbia, the regional administrator of the United States environmental protection agency, the administrator of the Bonneville Power Administration, the chief of engineers of the United States army corps of engineers, and the holder of a license issued for the Flathead project under the Federal Power Act;

(i) one ex officio member who shall be the director of the department of health and environmental sciences or his designee.

(3) The commissioners shall serve without pay. Commissioners mentioned in subsection (2)(a), except the commissioner on the governor's staff, are entitled to reimbursement for travel, meals, and lodging while engaged in commission business, as provided in 2-18-501 through 2-18-503.

(4) The commission is attached to the governor's office for administrative purposes only."

Approved March 18, 1985.

CHAPTER NO. 244

[HB 732]

AN ACT TO AUTHORIZE THE FLATHEAD BASIN COMMISSION TO RECEIVE AND EXPEND DONATIONS, GIFTS, GRANTS, AND OTHER MONEY TO FULFILL ITS DUTIES WITHOUT APPROPRIATION BY THE LEGISLATURE; AMENDING SECTION 75-7-305, MCA; AND PROVIDING AN IMMEDIATE EFFECTIVE DATE.

Be it enacted by the Legislature of the State of Montana:

Section 1. Section 75-7-305, MCA, is amended to read:

"**75-7-305. Commission authority.** (1) The commission may make recommendations to the legislature and the governor and to federal, tribal, provincial, and local agencies for maintenance and enhancement of the quality of natural resources of the Flathead basin.

(2) *The* commission may receive and expend donations, gifts, grants, and other money necessary to fulfill its duties. *[Such money, gifts, grants, and donations are statutorily appropriated, as provided in [section 2 of House Bill No. 12].]*"

APPENDIX C

Flathead Basin Commission
Financial Transactions
July 1, 1983, through June 30, 1985

The 1985 Legislature appropriated $45,000 to the commission for the FY 84-85 biennium.

Expenses during the biennium included executive director compensation, contracted services, and a contribution to help pay expenses for state of Montana involvement in the International Joint Commission's Flathead River Reference. Contracted services include: the University of Montana Biological Station for monitoring of Flathead Lake; the 49th Parallel Institute for annual report research and compilation and for staff assistance to the executive director and commission; Sandy Courtnage for preparation and production of the annual report; and the Montana Department of Natural Resources and Conservation for preparing graphics for the annual report.

	Subtotal	Total
1. Executive Director Compensation		
FY 83	$3,797.88	
FY85	6,698.44	$10,496.32
2. Flathead Lake Monitoring (University of Montana Biological Station)		
FY 84	5,000.00	
FY 85	5,000.00	10,000.00
3. 49th Parallel Institute (Montana State University)		
FY 85	15,200.00	15,200.00
4. Contribution towards International Joint Commission Flathead River Reference	5,088.45	5,088.45
5. Biennial Report Preparation and Printing FY 85 (accrued)	4,200.00	4,200.00
		$44,984.77

APPENDIX D

Flathead Basin Commission Activities

Sept. 28, 1983	Commission addressed by Governor Schwinden.
Nov. 14, 1983	Water quality monitoring in the basin called for by Dr. Stanford.
Jan. 9, 1984	CENEX test well plan presented. Cabin Creek mine proposal assessed. $5,000 in FBC funds voted for Yellow Bay Biological Station. FBC adopts FRBEIS recommendations 1, 3, 5, 6, 7, 9, 10, 11, 13, 14, 21, 24, 25, 26.
Feb. 10, 1984	Technical committee formed to develop a water quality monitoring plan, various member agencies commit funding for monitoring.
April 13, 1984	Hog Heaven, CoCa Mines plan presented. Master water quality plan finalized.
May 14, 1984	Lauren McKinsey, 49th Parallel Institute, retained as consultant for purpose of developing an FBC work plan. Federal funding from EPA for master monitoring plan withdrawn. Water Quality Bureau's 'Strategy for Limiting Phosphorus in Flathead Lake'' presented.
July 13, 1984	Northwest Power Planning Council basin fisheries and wildlife plan presented. Clark Fork Project presented.
Sept. 21, 1984	International Joint Commission/Cabin Creek Reference discussed. Speaker's Bureau, FBC brochure efforts begun.
Nov. 14, 1984	Commission votes to support upcoming subdivision review legislation. Resolution adopted seeking appropriation of a contingency fund to present Montana's case to the IJC. Brace Hayden replaces Mike Pichette as executive director. FBC endorses unanimously the Montana Bureau of Mines and Geology Legacy Fund request for groundwater studies. Commission moved to: 1) request an additional $20,000 as part of an interagency agreement for monitoring; 2) support the Water Quality Bureau's request for $15,000 per year to be part of the interagency network for Flathead Lake monitoring.
Jan. 24, 1985	Chairman Thurman Trosper resigns. Master water quality monitoring plan presented. Basin issues identified, discussed.
Feb. 26, 1985	Working subcommittees formed. Commission moves to: 1) support HB 711—the phosphorus detergent ban; 2) support Dr. Stanford's threshold status determination for Flathead Lake.
April 25, 1985	First annual report outline finalized, identifying issues confronting the basin. Briefing given on IJC Reference. Commission tours BN Somers creosote pit and hears EPA presentation.

APPENDIX E

MONITORING SURFACE WATER QUALITY IN THE FLATHEAD BASIN; MASTER PLAN

Open File Report. Prepared for the Flathead Basin Commission with the cooperation of technical representatives of the various agencies concerned with protection of water quality in the Flathead Basin by:

Jack A. Stanford, Flathead Lake Biological Station, University of Montana, Bigfork, Montana 59911 (406) 982-3301

30 July 1985

Introduction

In spite of its large size, the Flathead River Basin is uniquely interconnected hydrologically (e.g. stream to lake flow) and biologically (e.g. fish migrations) and must be considered an integrated ecosystem. However, management objectives within the basin vary widely, because of differing mandates of the many State and Federal agencies with legislated jurisdiction dealing with water quality within the Flathead River Basin. Also, several private corporations are producing timber on large land holdings within the basin. A major reason for the creation of the Flathead Basin Commission was to foster a coordinated management effort to protect and conserve the outstanding and valuable features of the Flathead ecosystem. The waters of the Flathead are abundant and generally pristine. It is now widely recognized that changes in water quality accurately reflect most of the environmental impacts associated with the myriad of land uses in the basin (FRBEIS, 1983). The Flathead Basin Commission has resolved to coordinate a water quality monitoring program and thereby foster a basic ecological ethic: clean water reflects a healthy environment (ecosystem). In support of this goal, a Master Plan for monitoring water quality in the Flathead River Basin is presented herein and is based on recommendations by water quality experts representing the various management agencies in the basin.

In the following pages monitoring tasks, sites, and agency responsibilities within this Master Plan are shown. Some, but not all, of the sites are presently being monitored; thus, new monitoring efforts are required for proper implementation of the Master Plan. It is emphasized that the sites and tasks given herein are considered the minimum required to develop a continuous record of basin-wide trends in **surface** water quality. Each site and task has been selected on the basis of: (1) present monitoring record, (2) ecological sensitivity of the sub-basin or tributary drainage, and (3) the usefulness of a particular site in describing the spectrum of geology and baseline water quality within the basin. It is recognized that limitations on funding may prevent immediate implementation of monitoring at all sites; therefore, sites have been prioritized within each sub-basin. The tasks identified (Table 1) are those which will best describe (or measure) long-term trends in water quality as well as encompass the major management objectives of each agency. Also, due to potential funding limitations in initial monitoring years, elements within each task are listed in order of priority (Table 1). Recommendations included in this Master Plan are based on a goal of obtaining a continuous monitoring record of not less than 10 years. This record will provide a basis for evaluating the effectiveness of various land, water, and wildlife management strategies in the Flathead River Basin. The Master Plan is presented with the hope that it will mediate conservation of the unique, pristine features of the basin.

Monitoring Tasks

Monitoring tasks include hydrological (e.g. discharge), physical (e.g. temperature; substrate composition), chemical (e.g. variables pertaining to eutrophication of Flathead Lake), and biological (e.g. limnological and fisheries) measures (Table 1).

Table 1. Monitoring tasks and variables to be monitored in time-series within the Flathead River Basin. Variables are listed in priority order within each task.

Task Code	Variable	Method Reference
DISC	Continuous recording: discharge.	Buchanan & Somers (1969)
INST	Instantaneous measure of discharge. (Staff gauge).	Buchanan & Somers (1969)
ELEV	Continuous recording: lake elevation.	Buchanan & Somers (1969)
TEMP	Continuous recording: temperature.	Stevens et al. (1975)
CHEMS	Chemical analyses of samples obtained on stream hydrograph (15 times/yr. plus 1 quality control duplicate): TSS; ALK; COND; pH; TP; NO_2 + NO_2; SRP; DA1; DOC; POC; SP; TKN; NH_3; DBa; DMo; DFe; DPb; DHg; DZn; SO_4; Cl; DIC.	Stanford et al. (1978)
CHEML	Analyses of samples pertaining to lake eutrophication and obtained on hydrograph (15 times/yr plus 1 duplicate): TP; SRP; SP; TSS; NO_2 + NO_2;TKN; NH_3; DIC; POC; DOC; $DSio_2$; ALK; COND; pH; TURB; DCa; DMg; DFe.	Stanford et al. (1983; 1985)
CHEMA	Analyses of samples pertaining to acid precipitation: pH; ALK; COND; Gran Acidity; DIC; NO_3; SO_4; DAl; Cl; DOC; POC; TP; SRP; SP; TKN; Fl; DFe; DCa; DMg; DNa; DK; DMo; DPb; DSe; DCo; (add TSS as 6th priority on stream sites).	Stanford et al. (1985)
PREC	Analyses of continuous collection of bulk precipitation (15 samples/yr): pH; DIC; TP; NO_3 + NO_2; SO_4; SRP; SP; TA1; DA1; TKN; Cl; NH_3.	Stanford et al. (1983; 1985)
BED	Analyses of sediment bed load transport using Helle-Smith Sampler 16 times/yr. on hydrograph.	Helle and Smith (1971)
LIMN	Analyses of limnological variables on hydrograph (water column profiles 15 times/yr): SECCHI; light, temp, O_2, cond, pH and chlorophyll profiles; algae biomass and species composition; zooplankton biomass and species composition; primary productivity.	Stanford et al. (1983)
FISH	Annual analyses of fisheries variables: redd counts or other population estimates; analyses of substrate composition.	Shepard and Graham (1983)
BEN	One set of 5 replicate samples of zoobenthos obtained in April.	Stanford et al. (1985)

Task methodology must be standardized and quality controlled per instructions given in the references cited in Table 1.

Data generated by each agency must be easily accessible, because the entire data set will be used individually by management agencies, the Flathead Basin Commission, and private concerns. Therefore, all physical and chemical data will be translated to EPA's computer file (STORET). All fisheries and limnology data will be translated to the computer file maintained by Montana Department of Fish, Wildlife and Parks (MDFWP) in Bozeman, Montana. Limnological data will be stored in computer files at the Flathead Lake Biological Station at Yellow Bay. Monitoring priorities and trends will be assessed annually by an interagency technical committee and included in the annual report of the Flathead Basin Commission (Fig. 1).

Groundwater monitoring is not included because, at present, too little information exists on the location and dynamics of groundwater resources for definition of long term monitoring objectives. This task will be incorporated into the Master Plan as soon as important groundwater resources are better understood from ongoing studies.

Monitoring Responsibility

The Master Plan calls for each agency or private concern to monitor variables and sites most closely related to individual management objectives and report results to the Flathead Basin Commission (Fig. 1; Table 2). The Flathead Lake Biological Station (FLBS) has no management authority, but will be monitoring some sites with funding provided by other agencies. Each agency is responsible for translating water quality data to the EPA STORET file and/or fisheries data to the MDFWP file.

Agencies involved in the Master Plan are listed below.

Table 2. Agencies involved in the Master Plan for long-term monitoring of water quality in the Flathead River Basin.

Agency Code	Agency Name
FLBS	Flathead Lake Biological Station, (University of Montana)
BR	U.S. Bureau of Reclamation
GS	U.S. Geological Survey
FWP	Montana Department of Fish, Wildlife and Parks
NPS	U.S. Park Service (Glacier National Park)
FL	U.S. Forest Service (Flathead National Forest)
SKT	Confederated Salish & Kootenai Tribes
WQB	Montana Department of Health and Environmental Sciences (Water Quality Bureau)
MDSL	Montana Department of State Lands
LCO	Lake County
FCO	Flathead County
PC	Plum Creek Timber Company
BN	Burlington Northern, Inc.
MPC	Montana Power Company
FBC	Flathead Basin Commission

The Master Plan specifies tasks that will, in some cases, impart new work in addition to regular (ongoing) agency duties. All agencies have projects in progress as a part of their mandated management objectives. Some of these data-gathering efforts are long term and are incorporated into the Master Plan. Other programs are short term and related to immediate decision processes. For example, U.S. Forest Service hydrologists may monitor site-specific water and sediment yield for short time periods to assist plans for proper harvest of particular timber stands; the MDFWP and NPS have many ongoing fisheries management studies on the large lakes (e.g. Whitefish; McDonald; Flathead). These routine tasks are outside the mission of the Master Plan, but may be summarized in annual reports of the FBC. In no case should the Master Plan for monitoring be considered a replacement for ongoing management efforts within particular agencies.

Although the Master Plan emphasizes the role of state and federal agencies, some private and local government concerns must be involved in the monitoring effort. The Confederated Salish and Kootenai Tribes and Burlington Northern, Inc. own major tracts of lands in the basin. Montana Power Company manipulates water levels in Flathead Lake and regulates flows downstream through operation of Kerr Dam. Boards of County Commissioners of Lake and Flathead counties are responsible for some aspects of water quality control and are main conduits for management options on private lands. Other entities may become involved in the Master Plan as their roles in water quality management become more defined (e.g. Bonneville Power Administration; Champion International; Arco Aluminum; Whitefish Ski Corp.; Montana Bureau of Mines and Geology).

Master Plan for Water Quality Monitoring

The Flathead Basin was divided into six areas, based largely on the major sub-basins (e.g. North Fork), for selection of monitoring sites (Table 3-9). Within each sub-basin or area, sites were prioritized in case funding constraints prevent complete implementation of monitoring at all 80 sites. A total of 35 sites were deemed priority; most of these are presently being monitored or are locations where a considerable data base is presently available. Monitoring tasks and variables were also listed in priority order (Tables 3-9) to provide orderly decisions on the basis of available funding.

To simplify the plan, individual agencies were assigned responsibility for monitoring each site (i.e. as coded under site location in Table 3-9). It is understood that some agencies may choose to contract or cooperate with other agencies to meet task assignments for each site. For example, the USFS will coordinate fisheries work with MDFWP; the counties, WQB, and CSKT may wish to continue to conduct monitoring of Flathead Lake through consortium funding (Stanford and Ellis 1985). In any case, each agency with a site assignment is responsible for: (1) data gathering by priority task and variable (Table 3-9); (2) conformance to methodology cited in Table 1; (3) annually reporting data to STORET computer file; and, 4) providing an annual summary report with appropriate interpretation to the Commission (Fig. 1). Prior to the reporting process, it is recommended that the agency personnel meet in a working forum to discuss results and future monitoring priorities.

Funding

Everyone involved in preparation of this report agreed that agency budgets will have to be adjusted to accommodate the Master Plan. It should be left to each agency to estimate those costs annually. However, in order to provide some idea of the annual cost of the Master Plan, estimates for the entire plan (Table 10) and the priority sites (Table 11) were derived. These cost estimates may be low because they do not include capital equipment and may not adequately represent administrative and travel costs. Notably, the USFS estimated a cost for their share of the plan at $217,000, rather than $148,000 (Table 10). The FBC will attempt to coordinate administrative adjustments to agency budgets to fund the entire Master Plan within the near future.

Agencies responsible for particular tasks may choose to contract other agencies for the actual work. In some cases this strategy is advisable because some agencies have more specific expertise and are better equipped for handling long term monitoring in the Flathead (e.g. USGS: discharge; FLBS: analytical chemistry). However, if standard methodologies (Table 1) are followed, it should not matter who actually does the work. The annual report of the FBC (Fig. 1) will include an evaluation of quality control measures in the data gathering effort.

Importance of the Master Plan

The Master Plan is based on the premise that key water quality and fisheries measures must be continually monitored in order to quantify progress toward basin-wide management goals for protection of aquatic resources. The environmental and economic health of the Flathead basin is closely tied to maintenance of clean water. This Master Plan allocates the monitoring workload among agencies and promotes interagency cooperation. It also insures constant re-evaluation of the status of water and fisheries resources in the Flathead Basin and will permit identification of new threats (e.g. pesticides and other organic pollutants often associated with development activities. Such considerations are important to the entire nation as well as Montana.

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Table 3. Monitoring sites and tasks by agency location number of the North Fork drainage. Priority sites: FBC1001, 1007, 1011, 1014, 1017, 1018, 1019.

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC1001	CS1235000	NF FHD R (internat. border)	(lat 49°00'02"; long ¼°28'35")	DISC
FBC1001	FWP1007	NF FHD R (internat. border)	(lat 49°00'02"; long ¼°28'35")	TEMP
FBC1001	NPS001	NF FHD R (internat. border)	NE¼ 5 37N 22W	CHEMS; PREC
FBC1001	FLBS1001	NF FHD R (internat. border)	NE¼ 5 37N 22W	BEN
FBC1002	NPS002	SAGE C	NE¼ 9 37N 22W	INST; TEMP; CHEMS
FBC1003	NPS003	SPRUCE C	NW¼ 23 37N 22W	INST; TEMP; CHEMS
FBC1004	NPS004	KISHENEHN C	SE¼ 23 37N 22W	DISC; TEMP; CHEMS
FBC1005	NPS005	STARVATION C	SE¼ 25 37N 22W	DISC; TEMP
FBC1006	NPS006	KINTLA C	NE¼ 1 36N 21W	DISC; CHEMA; TEMP
FBC1007	NPS007	GYRFALCON	NE¼ 35 36N 19W	CHEMA; LIMN[1]
FBC1008	NPS008	U. DUTCH L	SE¼ 5 34N 18W	CHEMA; LIMN[1]
FBC1009	NPS009	DUTCH C	SW¼ 7 33N 19W	DISC; CHEMA; TEMP
FBC1010	NPS010	QUARTZ C	NE¼ 18 34N 20W	DISC; CHEMA; TEMP
FBC1011	FL7104	TRAIL C	SE¼ 25 37N 23W	DISC; TEMP; CHEMS
FBC1011	FWP1003	TRAIL C	SE¼ 25 37N 23W	FISH
FBC1012	FL7002	WHALE C	SE¼ 30 36N 23W	DISC; TEMP; CHEMS
FBC1012	FWP1002	WHALE C	SE¼ 30 36N 23W	FISH
FBC1013	FWP1001	RED MEADOW C	NE¼ 11 35N22W	FISH
FBC1014	FL7009	N FK COAL C	SE¼ 24 34N 22W	INST; CHEMS; BED
FBC1014	FWP1004	N FK COAL C	SE¼ 24 34N 22W	FISH
FBC1015	FL7010	S FK COAL C	SE¼ 26 34N 22W	INST; CHEMS
FBC1016	FL7011	COAL C (DEADHORSE BG)	SW¼ 28 34N 21W	DISC; TEMP; BED; CHEMS
FBC1016	FWP1005	COAL C (DEADHORSE BG)	SW¼ 28 34N 21W	FISH
FBC1017	FL7007	BIG C (UPPER)	NE¼ 33 33N 21W	INST; CHEMS
FBC1017	FWP1006	BIG C (UPPER)	NE¼ 33 33N 21W	FISH
FBC1018	FL7004	BIG C (LOWER)	SW¼ 22 33N 20W	DISC; CHEMS; TEMP
FBC1019	GS1235500	NF FHD R (CANYON C)	NW¼ 35 32N 20W	DISC;
FBC1019	FLBS1002	NF FHD R (CANYON C)	NW¼ 35 32N 20W	BEN
FBC1019	FWP1008	NF FHD R (CANYON C)	NW¼ 35 32N 20W	TEMP
FBC1019	FL7102	NF FHD R (CANYON C)	NW¼ 35 32N 20W	CHEMS

[1] Sites sampled only twice per year for CHEMA and limited LIMN, due to poor winter access.

Table 4. Monitoring sites and tasks by agency location number on the Middle Fork drainage. Priority sites: FBC3001, 3002, 3005, 3006, 3010, 3012, 3013.

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC3001	NPS010	SNYDER L	SE¼ 10 33N 17W	CHEMA; LIMN[1]
FBC3002	NPS011	BUFFALO WOMAN L	SW¼ 1 31N 16W	CHEMA; LIMN[1]
FBC3003	NPS012	OLE C	NE¼ 14 29N 16W	DISC; TEMP; CHEMA
FBC3003	FWP3001	OLE C	NE¼ 14 29N 16W	FISH
FBC3004	NPS013	MCDONALD C (APGAR)	NW¼ 23 32N 19W	DISC; CHEMA
FBC3004	FWP3002	MCDONALD C	NW¼ 23 32N 19W	FISH; TEMP
FBC3005	NPS014	MCDONALD L	SE¼ 32 33N 18W	CHEMA; PREC; FISH
FBC3006	FL6005	CHALLENGE C	SW¼ 32 29N 13W	INST; CHEMS; BED
FBC3006	FWP3005	CHALLENGE C	SW¼ 32 29N 13W	FISH
FBC3007	FL6014	WOUNDED BUCK C	SE¼ 18 29N 18W	DISC
FBC3008	FWP3003	MORRISON C	NW¼ 9 28N 18W	FISH
FBC3009	FWP3004	LODGEPOLE C	SE¼ 2 27N 13W	FISH
FBC3010	FWP3006	GRANITE C	SW¼ 7 28N 13W	FISH
FBC3011	FL6011	MF FHD R (BEAR C)	SE¼ 36 29N 16W	INST; CHEMS
FBC3012	GS12358500	MF FHD R (W GLACIER)	SW¼ 34 32N 19W	DISC
FBC3012	FWP3007	MF FHD R (W GLACIER)	SW¼ 34 32N 19W	TEMP
FBC3013	FL6101	MF FHD R (BLANKENSHIP)	NE¼ 7 31N 19W	INST; CHEMS

[1] Sites sampled only twice per year for CHEMA and limited LIMN, due to poor winter access.

Table 5. Monitoring sites and tasks by agency location number on the South Fork drainage. Priority sites: FBC2010, 2011.

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC2001	FWP2001	SF FHD R	NW¼ 8 24N 14W	FISH
FBC2002	FL4005	WHITCOMB C (UPPER)	SW¼ 1 25N 14W	INST; CHEMS
FBC2003	FL4001	WHITCOMB C (LOWER)	NE¼ 12 25N 14W	FISH; INST; CHEMS
FBC2004	FL4024	WF WHITCOMB C	SW¼ 1 25N 14W	INST; CHEMS
FBC2005	FL4104	SPOTTED BEAR R	SW¼ 17 25N 15W	CHEMS
FBC2006	FL4106	SF FHD R	NE¼ 36 26N 16W	CHEMS
FBC2006	GS12359800	SF FHD R (TWIN C)	NE¼ 36 26N 16W	DISC; TEMP
FBC2008	FL4004	SULLIVAN C	NE¼ 23 26N 17W	INST; CHEMS; BED
FBC2008	FWP2003	SULLIVAN C	NE¼ 23 26N 17W	FISH
FBC2009	FL6102	HUNGRY HORSE C	NW¼ 22 30N 18W	INST; CHEMS
FBC2009	FWP2002	HUNGRY HORSE C	NW¼ 22 30N 18W	FISH
FBC2010	GS12362000	HUNGRY HORSE RES	NE¼ 27 30N 19W	ELEV
FBC2010	FWP2004	HUNGRY HORSE RES	NE¼ 27 30N 19W	FISH
FBC2011	BREC01	SF FHD R	SW¼ 22 30N 19W	CHEMS
FBC2012	GS12362500	SF FHD R	SW¼ 16 30N 19W	DISC
FBC2012	FWP2005	SF FHD R	SW¼ 16 30N 19W	TEMP

Table 6. Monitoring sites and tasks by agency location number on the Stillwater-Whitefish drainage. Priority sites: FBC4004, 4006, 4011, 4016, 4017, 4018, 4019, 4020, 4021, 4022.

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC4001	GS12363920	STILLWATER R (OLNEY)	NE¼ 18 32N 23W	DISC; CHEMS; TEMP
FBC4002	FL8002	GREGG C	NE¼ 14 31N 25W	INST; CHEMS
FBC4004	FL8010	HAND C	NW¼ 6 29N 25W	DISC; TEMP; CHEMS
FBC4005	FL8020	SQUAW MEADOWS C	NW¼ 15 29N 25W	INST; CHEMS
FBC4006	FL8021	TRIB SQUAW MEADOWS C	SW¼ 15 29N 25W	DISC; TEMP; CHEMS
FBC4007	FL8103	LOGAN C (TALLY L)	SW¼ 30 31N 23W	INST; CHEMS
FBC4008	FWP4003	TALLY L	NE¼ 31 31N 23W	FISH
FBC4009	DSL001	FITZSIMMONS C	SW¼ 5 34N 24W	INST; CHEMS
FBC4010	DSL002	CHEPAT C	NW¼ 5 34N 24W	INST; CHEMS
FBC4011	GS12365000	STILLWATER R	SW¼ 34 30N22W	DISC; TEMP
FBC4012	DSL003	WF SWIFT C	SW¼ 34 34N 23W	INST; CHEMS
FBC4013	DSL004	EF SWIFT C	NW¼ 1734N23W	INST; CHEMS
FBC4014	DSL005	CHICKEN C	SE¼ 14 33N 23W	INST; CHEMS
FBC4015	DSL006	SWIFT C	NW¼ 24 33N 23W	INST; CHEMS
FBC4016	DSL007	SWIFT C (WTF L)	NE¼ 5 31N 22W	INST; CHEML; TEMP
FBC4017	PC4001	LAZY C (WTF L)	SW¼ 5 31N 22W	INST; CHEML
FBC4018	FCO001	WHITEFISH L	NE¼ 22 31N 22W	CHEML(1)[a]; PREC; LIMN[b]
FBC4018	FWP4001	WHITEFISH L	NE¼ 22 31N 22W	FISH
FBC4019	FCO002	WHITEFISH R (WTF L)	SE¼ 26 31N 22W	INST; CHEML
FBC4020	GS12366000	WHITEFISH R	SW¼ 34 30N 21W	DISC; TEMP
FBC4021	FWP4002	WHITEFISH R	NW¼ 2730N21W	FISH
FBC4022	WQB001	STILLWATER R (BELOW SP C)	SW¼ 9 28N 21W	DISC; CHEML

[a] 4 times per year at one site (midlake) and one depth (5 m)

[b] limited analysis 4 times per year (on or about 15 April; 15 June; 1 Aug; 30 Sept)

- *in situ* profiles at midlake site and selected bays for DO, pH, Cond, Temp, Chl, transmission, secchi depth
- analysis of phytoplankton species composition and biomass from the midlake site at 5 m depth

Table 7. Monitoring sites and tasks by agency location number on the Swan drainage. Priority sites: FBC6002, 6009, 6010

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC6001	GS12369200	SWAN R (CONDON)	NW¼ 8 19N 26W	DISC; TEMP; CHEMS
FBC6002	FLBS6001	LION C	NE¼ 14 22N 17W	TEMP; CHEMS
FBC6002	FL1021	LION C	NE¼ 14 22N 17W	DISC; BED
FBC6002	FWP6001	LION C	NE¼ 14 22N 17W	FISH
FBC6003	FWP6002	GOAT C	NE¼ 16 23N 17W	FISH
FBC6004	FWP6003	ELK C	SE¼ 16 20N 17W	FISH
FBC6005	FL1101	SQUEZZER C	SE¼ 21 23N 17W	CHEMS
FBC6005	FWP6004	SQUEZZER C	SE¼ 21 23N 17W	FISH
FBC6006	FL1026	KRAUSE C	SE¼ 21 28N 19W	INST; CHEMS
FBC6007	FWP6005	SWAN L	14 25N 18W	FISH
FBC6008	BN01	SWAN R (PORC C)	NE¼ 34 25N 18W	DISC; CHEML
FBC6009	WQB002	SWAN R (AT BIGFORK)	NE¼ 36 27N 20W	CHEML
FBC6010	GS12370000	SWAN R (NEAR BIGFORK)	SW¼ 11 26N 19W	DISC

Table 8. Monitoring sites and tasks by agency location number on the upper mainstem Flathead River drainage. Priority sites: FBC5001, 5003, 5012, 5013, 5014, 5020, 5022.

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC5001	GS123600	FHD R (COL FALLS)	SE¼ 17 30N 20W	DISC; CHEMS
FBC5001	FWP5007	FHD R (COL FALLS)	SE¼ 17 30N 20W	FISH
FBC5002	FWP5009	L BLAINE	26 29N 20W	FISH
FBC5003	WQB003	ASHLEY C	NW¼ 36 28N 21W	DISC; CHEML
FBC5004	FWP5004	ASHLEY L	14 28N 23W	FISH
FBC5005	FWP5002	ASHLEY C (L OUTLET)	NE¼ 23 28N 24W	DISC
FBC5006	FWP5003	ASHELY C (MERIDIAN BRIDGE)	SE¼ 13 28N 22W	DISC
FBC5007	FWP5010	FHD R (BRENNEMAN SLOUGH)	SE¼ 22 28N 21W	FISH
FBC5008	FWP5011	FHD R (KOKANEE BEND)	NW¼ 30 30N 20W	FISH
FBC5009	FWP5012	FHD R (HOUSE OF MYSTERY)	SW¼ 3 30N 20W	FISH
FBC5010	FWP5013	GREEN MT C	NE¼ 28 28N 23W	FISH
FBC5011	FWP5008	ECHO L	5 27N 19W	FISH
FBC5012	WQB004	FHD R (HOLT)	NE¼ 22 27N 20W	CHEML
FBC5013	GS12371500	FHD L (SOMERS)	NE¼ 26 27N 21W	ELEV
FBC5024	WQB005	FLATHEAD L	NE¼ 4 24N 19W	PREC
FBC5014	WQB006	FLATHEAD L	SE¼ 5 24N 19W	CHEML (3 depths)
FBC5014	FBC5014			
FBC5014	LCO001			
FBC5014	FCO003	FLATHEAD L	SE¼ 5 24N 19W (Midlake Deep)	LIMN
FBC5014	MPC001			
FBC5014	SKT001			
FBC5014	FWP5005	FLATHEAD L	SW¼ 5 24N 19W	FISH
FBC5015	FWP5001	FISH C	NW¼ 15 28N 24W	FISH
FBC5016	FLBS5002	CRANE C	SE¼ 5 25N 19W	TEMP; CHEML
FBC5016	FL1105	CRANE C	SE¼ 5 25N 19W	DISC
FBC5017	FLBS5001	ROYS C	NE¼ 4 24N 19W	DISC, CHEML
FBC5018	WQB007	STONER C	NE¼ 18 26N 20W	DISC; CHEML
FBC5019	FWP5006	L MARY BROWN	14 25N 22W	FISH
FBC5020	SKT5002	YELLOW BAY C	NE¼ 4 24N 19W	DISC; CHEML
FBC5021	WQB0007	FHD R (POLSON)	SW¼ 4 22N 20W	CHEML
FBC5022	GS1237200	FHD R (KERR)	SE¼ 11 22N 21W	DISC; TEMP
FBC5023	MPC002	FHD R (PERMA)	NW¼ 31 19N 23W	DISC; TEMP; CHEMS

Table 9. Monitoring sites and tasks by agency location number on tributaries below Kerr Dam. Priority sites: none.

FBC Site No.	Agency Code	Name	Location	Monitoring Tasks
FBC9001	SKT9003	POST C (ABOVE MCD L)	SW¼ 12 19N 19W	DISC; CHEMA; TEMP
FBC9002	SKT9004	MISSION C (ABOVE MISSION RES)	NW¼ 14 18N 19W	DISC; CHEMA; TEMP
FBC9003	SKT005	MISSION C (AT FHD R)	NW¼ 4 18N 21W	DISC; CHEMS; TEMP; FISH
FBC1101	SKT006	JOCKO R	NW¼ 35 17N 18W	DISC; CHEMS; TEMP; FISH
FBC1102	SKT007	JOCKO R (AT FHD R)	NW¼ 17 18N 21W	DISC; CHEMS; TEMP; FISH
FBC1201	BN0002	L. BITTER ROOT R	NE¼ 28 25N 24W	DISC; CHEMS
FBC1202	SKT1207	L. BITTER ROOT R (AT FHD R)	NE¼ 13 20N 22W	DISC; CHEMS; TEMP; FISH

Table 10. Annual budget for implementation of Master Plan, expressed in 1985 dollars and based on estimated task costs (in parentheses) x number of sites per task for each agency.

AGENCY	TASK DISC ($3000)	INST ($100)	ELEV ($3000)	TEMP ($300)	CHEMS ($3648)	CHEML ($2864)	CHEMA ($3280)	PREC ($2910)	LIMN ($30K)	FISH ($3000)	BEN ($2000)	BED (?)	ANNUAL AGENCY BUDGET
USGS	11	-	2	7	3	-	-	-	-	-	-	5	$ 52,044 +
FL	9	17	-	8	26	-	-	-	-	2[a]	-	-	131,948
NPS	7	2	-	7	4	-	5[b]	2	-	1	-	-	63,112
BR	-	-	-	-	1	-	-	-	-	-	-	-	3,648
FWP	2	-	-	5	-	-	-	-	-	35[a]	-	-	112,500
WQB	3	-	-	-	-	9	-	1	-	-	-	-	37,686
DLS	-	7	-	-	6	1	-	-	-	-	-	-	25,452
FBC	-	-	-	-	-	-	-	-	1[c]	-	-	-	10,000
FCO	-	1	-	-	-	2	-	1	2[c]	-	-	-	46.238
LCO	-	-	-	-	-	-	-	-	1[c]	-	-	-	7,500
SKT	7	-	-	6	4	1	2	-	1[c]	4	-	-	63,816
MPC	1	-	-	1	1	1	-	-	-	-	-	-	9,812
PC	-	1	-	-	-	1	-	-	-	-	-	-	2,964
BN	2	-	-	-	1	1	-	-	-	-	-	-	12,512
FLBS	1	-	-	2	1	2	-	-	-	-	2	-	16,976
										ANNUAL TOTAL			$510,512

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[a] Cooperative effort FL-FWP.

[b] In addition 4 remote lakes and Lake McDonald are sampled twice per year from CHEMA and limited LIMN.

[c] Consortium funding for LIMN on Flathead Lake: SKT-$5,000; LCO-$7,500; FCO-$7,500; FBC-$10,000 = $30,000.

Table 11. Annual budget for priority sites in Master Plan, expressed in 1985 dollars and based on task costs (in parentheses) x number of sites per task for each agency.

AGENCY	TASK DISC ($3000)	INST ($100)	ELEV ($3000)	TEMP ($300)	CHEMS ($3648)	CHEML ($2864)	CHEMA ($3280)	PREC ($2910)	LIMN ($30K)	FISH ($3000)	BEN ($2000)	BED (?)	ANNUAL AGENCY BUDGET
USGS	8	-	2	3	1	-	-	-	-	-	-	-	$ 34,548
FL	5	4	-	4	8	-	-	-	-	[a]	-	3	45,784 +
NPS	1	-	-	-	1	-	[b]	2	[b]	1	-	-	26,758
BR	-	-	-	-	1	-	-	-	-	-	-	-	3,648
FWP	-	-	-	4	-	-	-	-	-	10[a]	-	-	31,200
WQB	2	-	-	-	-	7	-	1	-	-	-	-	28,958
DLS	-	1	-	1	-	1	-	-	-	-	-	-	3,264
FBC	-	-	-	-	-	-	-	-	1[c]	-	-	-	10,000
FCO	-	1	-	-	-	2	-	1	2[c]	-	-	-	46,238
LCO	-	-	-	-	-	-	-	-	1[c]	-	-	-	7,500
SKT	1	-	-	-	-	1	-	-	1[c]	-	-	-	10,864
MPC	-	-	-	-	-	-	-	-	-	-	-	-	0
PC	-	1	-	-	-	1	-	-	-	-	-	-	2,964
BN	-	-	-	-	-	-	-	-	-	-	-	-	0
FLBS	-	-	-	1	1	1	-	-	-	-	1	-	8,812
										ANNUAL TOTAL			$260,538

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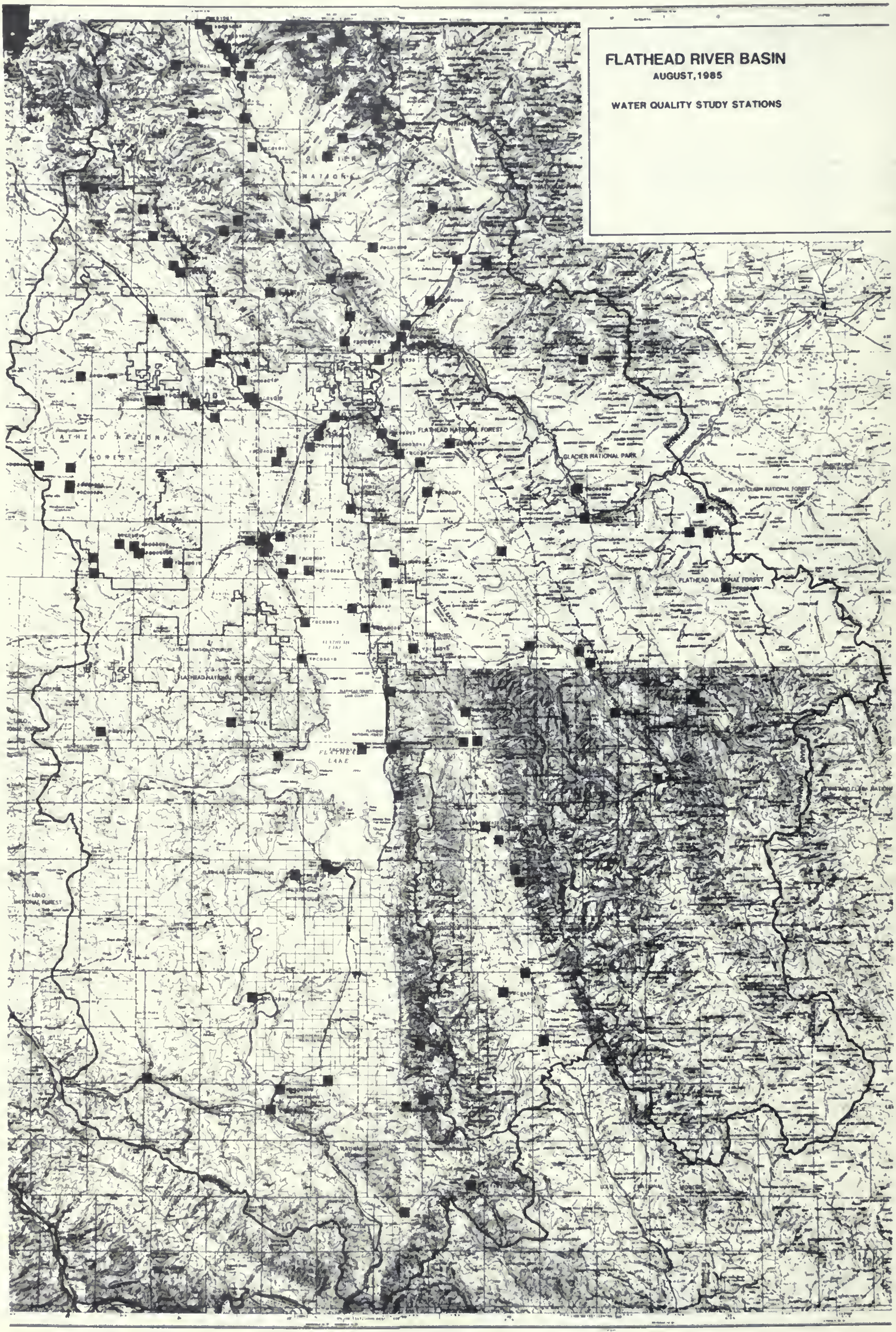
[a] Cooperative effort FL-FWP.

[b] In addition 4 remote lakes and Lake McDonald are sampled twice per year from CHEMA and limited LIMN.

[c] Consortium funding for LIMN on Flathead Lake: SKT-$5,000; LCO-$7,500; FCO-$7,500; FBC-$10,000 = $30,000.


FLATHEAD RIVER BASIN
AUGUST, 1985
WATER QUALITY STUDY STATIONS
FLATHEAD NATIONAL FOREST
GLACIER NATIONAL PARK
LEWIS AND CLARK NATIONAL FOREST
FLATHEAD NATIONAL FOREST
FLATHEAD NATIONAL FOREST
FLATHEAD LAKE
FLATHEAD INDIAN RESERVATION

APPENDIX F

Advanced Waste Treatment. Methods and processes that will remove more contaminants from wastewater than are usually removed in present day conventional treatment plants. The processes may be physical, chemical or biological. Examples of advanced waste treatment are granular carbon absorption, nutrient removal, reverse osmosis, electrodialysis, and ion exchange.

Algae. Primitive nonvascular plants, having one or many cells, usually aquatic and capable of fixing carbon dioxide by photosynthesis.

Aquatic. Plants or animal life living in, growing in, or adapted to water.

Available Nutrient. That portion of any element or compound (such as phosphorus and nitrogen) in the soil that can be readily absorbed and assimilated by growing plants.

Avoided Cost. The cost that a power company would have to pay in lieu of energy production based on historic conditions and generally accepted industry standards, for a small or alternative energy producer's product.

Baseline. A collection of data ideally assembled prior to the introduction of change, such as a new activity, in order to compare the effects of the added event to previous conditions.

Best Management Practices (BMPs). Methods, measures, or practices to prevent or reduce water pollution, including, but not limited to, structural and nonstructural controls and operation and maintenance procedures. BMPs may be applied before, during, or after pollution-producing activities to reduce or eliminate the introduction of pollutants into water bodies.

Biochemical Oxygen Demand (B.O.D.). The quantity of oxygen utilized in the biochemical oxidation of organic matter in a specified time and at a specified temperature. Waste discharges containing high levels of B.O.D. will deplete oxygen supplies in receiving waters.

Biological Availability. Refers to the form that a substance or compound can take that can be readily used for plant or animal growth. Depending on their chemical structure, certain compounds are more available for plant growth than others.

Buffer Strip. Strips of grass or other erosion-resistant vegetation between a waterway and an area of more intensive land use.

Data Base. A collection of information kept in accessible form for purposes of research, comparison and analysis.

Dissolved Oxygen (DO). The amount of free oxygen dissolved in water and readily available to aquatic organisms. It is usually expressed in milligrams per liter or as the percent of saturation. Low concentrations can result from the decomposition of excessive amounts of organic matter, a process that consumes DO and therefore limits aquatic life.

Effluent. Liquid waste attributed to human waste, i.e. sewage arising from various uses of water.

Erosion. The wearing away of a land surface by wind or water. Erosion occurs naturally from weathering or runoff but can be intensified by land clearing practices. Sheet erosion occurs when water runs off in unbroken layers over the soil surface; rill erosion occurs when water runs off in incisions less than 12 inches deep through the soil; and gully erosion results in trenches deeper than 12 inches in the soil.

Eutrophication. The addition of nutrients to a body of water. This occurs naturally as part of the normal aging process of many lakes; however, the process may be accelerated by human activities that result in excessive nutrient inputs that promote abundant growth of algae and other aquatic plants. As these die and decompose, much of the dissolved oxygen in the water is consumed, making the lake uninhabitable for the previous diversity of fish and other aquatic life.

Groundwater. The supply of fresh water that forms a natural reservoir under the earth's surface.

Groundwater Recharge. The natural renewal of ground water supplies by infiltration through the soil of rain or other precipitation.

Heavy Metals. Metallic elements such as mercury, chromium, cadmium, arsenic, and lead, with high molecular weights. At low concentration, they can damage organisms; heavy metals tend to bioaccumulate in the food chain.

Leaching. The removal of nutrients, chemicals, or contaminants from the soil by water movement through the soil profile.

Mesotrophic. Descriptive of lakes in transition from oligotrophic status toward eutrophic. They are still generally pristine, but fish species are mixed, nutrient levels are higher and water is not quite as crystal clear.

Nitrogen. A chemical element, commonly used in fertilizer as a nutrient, which is also a component of animal wastes; as one of the major nutrients required for plant growth, it can promote algal blooms that cause water body eutrophication if it runs off or leaches out of the surface soil. Available nitrogen is a form that is immediately usable for plant growth (NO-3 or NH $^{+}$4).

Nonpoint Source. A diffuse source of water pollution that does not discharge through a pipe, such as agricultural or urban runoff, or runoff from construction activities.

Nutrient Budget. The quantity of a given element or compound available for plant productivity over time. Changes in plant productivity are directly related to changes in the nutrient budget.

Nutrient Loading. Increases in the nutrient budget attributed to either increases from human-related or natural events.

Nutrients. Elements or substances such as nitrogen and phosphorus that are necessary for plant growth. In water bodies, large amounts promote excessive growth of aquatic plants and cause eutrophication of the water body.

Oligotrophic. Descriptive of crystal-clear lakes characterized by cold water fish species, low nutrient content and generally pristine features.

Phosphorus. One of the primary nutrients required for the growth of aquatic plants and algae. Phosphorus is often the ''limiting' nutrient for the growth of these plants. (See nitrogen)

Point Source. A discernable source of pollution, such as pipes, ditches, channels, wells, containers, concentrated animal feeding operations, or other vessels.

Revegation. The planting of ground cover on highly erodible and marginal lands as a means of preventing further erosion.

River Hydrograph. The pattern of a river or lake expressed as in-flow and out-flow ratios, such as cubic feet per second; and containing temperature, chemical and other expected characteristics.

Runoff. Water from rain, snow melt, or irrigation that flows over the ground surface and returns to streams. It can collet pollutants from air or land and carry them to the receiving waters.

Secondary Treatment. May be defined as that process or group of processes capable of removing virtually all floating and settleable solids, generally from 80 to 95 percent of the five-day biochemical oxygen demand, and a similar level of removal of suspended solids in untreated waste. The equivalent treatment may generally be defined as that process or group of processes achieving maximum practicable removal of solids, oils, grease, acids, alkalis, toxic materials, bacteria, taste and odor-causing materials, color and any other objectionable constituents contained in untreated waste to produce an effluent equivalent to that obtained from secondary treatment facilities in current use for any specific category of industrial waste. (Properly designed and operated sewage lagoons are acceptable secondary treatment facilities for domestic wastes.)

Sediment. Solid material (such as silt, sand, or organic matter) that has been moved from its site of origin and has settled to the bottom of a watercourse or water body. Excessive amounts of sediment can clog a watercourse and interfere with navigation, fish migration and spawning. If disturbed, sediment can be resuspended in the water column, where it contributes to turbidity.

Suspended Solids. Solids floating in the water column that generally impart a cloudy appearance (turbidity) to water, sewage, or other liquids. Suspended solids are measured as the amount of material retained on standard filters.

Tailings. Residue of raw materials or waste separated out during the processing of mineral ores.

Tertiary Treatment. See Advanced Water Treatment.

Trophic Status. The descriptive phase of a lake: oligotrophic, mesotrophic, eutrophic or somewhere in between. Flathead Lake currently is described as oligo-mesotrophic.

Turbidity. Haziness or cloudiness in water because of suspended silt or organic matter.

Watershed. The area of land that drains into a particular watercourse or water body.

APPENDIX G

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APPENDIX H

List of Legal Citations
Federal:

Clean Water Act: Public Law 92-500.
Land Policy and Management Act: Public Law 90-2776.
Resource Conservation and Recovery Act: Public Law 94-580.
Safe Drinking Act: Public Law 93-523, 95-190.

State:

Exploration, development on state lands: Title 77, Chapter 4, MCA.
Flood plain development: Title 76, Chapter 5, MCA.
Geophysical exploration, drilling: Title 82, MCA.
Hardrock exploration: Title 82, Chapter 4, MCA.
Hydropower: Title 85, Chapter 1, MCA.
Lakeshore protection: Title 75, Chapter 7, MCA.
Lease of state lands: Title 77, Chapter 6, MCA.
Mineral leasing: Title 77, Chapters 3 & 4, MCA.
Public water supply: Title 75, Chapter 6, MCA.
Sanitation in subdivision: Title 76, Chapter 4, MCA.
Seismic exploration: Title 87, Chapter 1, MCA.
Streambeds: Title 87, Chapter 5, MCA.
Subdivisions: Title 76, Chapter 3, MCA.
Water quality: Title 75, Chapter 5, MCA.

APPENDIX I

Text of International Joint Commission Directive to the Flathead River International Study Board (April 18, 1985)

Whereas the Governments of the United States and Canada have forwarded the attached Reference, dated December 19, 1984, and February 15, 1985, respectively, to the Commission for examination and report pursuant to Article IX of the Boundary Waters Treaty of 1909:

Whereas the Commission, in its decision of April 18, 1985, established the Flathead River International Study Board to undertake, through appropriate governmental or other agencies in the United States and Canada, the investigations and studies set out below.

The Commission directs that:

1. The Board shall examine into and report to the Commission upon the following:

(a) The present state of water quality and water quantity of the Flathead River at the border (including fluctuations);

(b) current water uses (including water dependent uses such as recreation) in the Flathead River basin together with their effects on present water quality and quantity;

(c) the nature, location and significance of fisheries currently dependent on the waters of the Flathead River and its tributaries, Howell and Cabin Creek;

(d) effects on the present state of water quality and water quantity of the Flathead River at the border which would result from the construction, operation and post-mine reclamation of the proposed Cabin Creek coal mine;

(e) effects on current water uses (including water dependent uses such as recreation) which would result from effects on the present state of
(i) water quality, and
(ii) water quantity
which have been identified under paragraph (d); and

(f) effects which the construction, operation and post-mine reclamation of the proposed Cabin Creek coal mine would have on the habitat for fisheries in Canada in the waters of the Flathead River and its tributaries Howell and Cabin Creek, and consequent effects on fisheries in the United States.

2. In carrying out its examinations the Board shall take into account and provide an assessment of all factors necessary and relevant to the determinations and predictions required persuant to section 1.

3. The Board shall as soon as possible prepare and submit for Commission approval a Plan of Study for the investigations that it proposes to undertake as well as a schedule of the estimated time and costs required. The Board shall submit its report on the issues in paragraph 1 to the Commission before May 15, 1986. The board shall also submit interim reports to the Commission regarding any effects identified under paragraph (e) above as soon as it identifies those effects.

4. The Board shall, to the extent possible, identify in its Plan of Study the committee and working groups which it will require to implement this Directive.

5. The Board shall carry out the Plan of Study approved by the Commission. If, at any time, it appears to the Board that the Plan of Study should be modified, it shall advise the Commission accordingly and request instructions from the Commission.

6. The Commission may amend existing instructions or issue new instructions to the Board at any time.

7. In the conduct of its investigations and in the preparation of its report or reports, the Board should use of information and technical data heretofore available, or which may become available during the course of the investigations.

8. Members of the Board, and of its committees and working groups, whether or not employed by departments or agencies of government, are not representatives of their employers. They serve in a personal and professional capacity under the direction of the Commission. The Commission will not consider that their employers or superior officers are committed in any way by the actions of individual members or of the Board.

9. In carrying out its functions under this Directive, the Board will act as a unitary body, through joint, integrated and co-ordinated efforts.

10. Each Chairman shall ensure that the other members of his Section of the Board are informed of all instructions, inquiries and authorizations received from the Commission, as well as of activities undertaken by or on behalf of the Board, progress made and any developments affecting such progress.

11. A Chairman, after consulting the other members of his Section of the Board, may appoint a Secretary of that Section. Under the general supervision of the Chairman, the Secretary shall carry out such duties as are assigned to him by the Section.

12. Members of the Board and of Committees and working groups will normally make their own arrangements for reimbursement of necessary expenditures for travel.

13. The Chairmen shall keep the Commission currently informed of the Board's plans and progress and of any developments, actual or anticipated, which are likely to impede, delay or otherwise affect the carrying out of the Board's responsibilities. To this end, the board shall submit progress reports to the Commission on October 1, 1985 and February 1, 1986 describing the progress that has been made and any problems that have arisen in the investigation. The Board shall also submit reports at such other times as the Commission may request or the Board may consider necessary. All such reports shall be sent to the Secretaries and to each member of the commission. In addition, the Board shall ensure that members of the Commission staff who are designated as liaison officers are kept fully informed of the Board's work on an on-going basis.

14. If, in the opinion of the Board there is a lack of clarity or precision in any instruction, directive or authorization received from the Commission, the matter shall be referred promptly to the Commission for appropriate action.

15. Documents, letters, memoranda and communications of every kind in the official records of the Commission are privileged and become available for public information only after release by the Commission. The Commission considers all documents in the official

records of the Board or of any of its committees to be similarly privileged. Accordingly, all such documents shall be so identified and maintained in separate files. They shall become available for public information only after Commission approval.

David A. LaRoche	David G. Chance
Secretary	Secretary
United States Section	Canadian Section

APPENDIX J

After developing the strategy to limit the phosphorus entering Flathead Lake, both permits and construction grants began working with municipalities within the basin to meet the proposed 1.0 mg/1 phosphorus effluent limit. The following is the status of each community.

	Bigfork Total Project	Kalispell Total Project	Whitefish Total Project	Columbia Falls Total Project	Lakeside Total Project	Totals
Capital Costs	$2,500,000	$1,460,000	$1,778,000	$390,000	$4,920,000	$11,048,000
Annual O & M	$108,000	$102,000	$67,000	$25,000	$70,460	$372,460
Annual Capital Costs and O & M	$212,800	$159,000	$110,400	$51,700	$585,690	$1,119,590
Number of Households	710	3,725	2,400	—	450 - 650	—
Annual Cost per Household	$300	$43*	$62**	$42	$365 - $253	$812 -$700
% Annual Household Income	1.9%	0.3%	0.4%	—	—	—

*Excludes existing debt retirement and O & M: existing rates range from $10-15/mo/user.

**Excludes existing debt retirement and O & M - existing rates range from $5.50 to $9.63/mo for a minimum bill.

1984 dollars—total project cost for phosphorus removal to 1.0 mg/1 TP Kalispell and Bigfork receive 75% grant; Whitefish and Columbia Falls receive 55% grant; Lakeside will receive 78%.

APPENDIX K

CHAPTER NO. 574

[HB 711]

AN ACT ALLOWING A GOVERNING BODY OF A COUNTY TO PROHIBIT THE SALE AND DISTRIBUTION OF CERTAIN PHOSPHORUS COMPOUNDS USED FOR CLEANING PURPOSES; REQUIRING THE DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES TO ADOPT A MODEL RULE; AND PROVIDING A DELAYED EFFECTIVE DATE.

WHEREAS, Montana's outstanding environmental and economic values depend on maintaining excellent water quality; and

WHEREAS, phosphorus is a nutrient that stimulates the growth of algae and contributes to a decline in water quality in certain lakes and rivers; and

WHEREAS, substantial amounts of phosphorus enter Montana's aquatic ecosystems as a result of the use of detergents; and

WHEREAS, many studies have shown that regional restrictions on the use of nonessential detergent phosphorus compounds have protected and enhanced water quality; and

WHEREAS, the Department of Health and Environmental Sciences has determined that excessive amounts of culturally derived phosphorus are jeopardizing water quality in some of Montana's most outstanding waters; and

WHEREAS, the Department of Health and Environmental Sciences has the expertise to develop a model rule to effectively limit the amount of detergent phosphorus compounds that will enter state waters; and

WHEREAS, a limitation on the sale and distribution of certain detergent phosphorus compounds may best be enacted to meet local needs and circumstances; and

WHEREAS, such a limitation will not cause additional costs or burdens to consumers and retailers.

THEREFORE, the Legislature finds it appropriate to allow county governments to protect and enhance water quality by prohibiting the sale and distribution of certain nonessential detergent phosphorus compounds, following the technical standards established by the Department of Health and Environmental Sciences.

Be it enacted by the Legislature of the State of Montana:

Section 1. **Adoption and amendment of model rule on sale and distribution of certain phosphorus compounds.** (1) The department [of health and environmental sciences] shall adopt a model rule to provide standards that counties may adopt under [section 4] to prohibit the sale and distribution of certain phosphorus compounds used for cleaning.

(2) The standards in the model rule must be designed to protect water quality and aquatic ecosystems by reducing the amount of phosphorus that will enter state waters.

(3) The department may amend the model rule to:

(a) reflect changing technology related to phosphorus compounds in cleaning products;

(b) incorporate new findings about the impacts of phosphorus compounds on water quality; or

(c) respond to other relevant information.

(4) The department shall follow the procedures of Title 2, chapter 4, part 3, in adopting or amending the model rule.

Section 2. **Prohibition of enforcement by department.** The department may not enforce any standard or provision of the model rule. As provided in [section 4], the governing body of a county may adopt and enforce as an ordinance the standards contained in the model rule.

Section 3. **Distribution of model rule.** The department shall send to the governing body of each county a notice of any rulemaking proceeding or hearing under [section 1], a copy of the model rule, and a copy of any amendment proposed or adopted.

Section 4. **County regulation of sale and distribution of certain phosphorus compounds.** (1) The governing body of a county may adopt, through the procedures of 7-5-103 through 7-5-107, an ordinance prohibiting the sale and distribution of certain phosphorus compounds used for cleaning purposes. The governing body may rescind, modify, or repeal such ordinance at any time by use of the same procedures.

(2) An ordinance prohibiting the sale and distribution of certain phosphorus compounds used for cleaning purposes may only be adopted if:

(a) the county has a natural lake, whether or not it is fitted with a dam, for which the department of health and environmental sciences or the governing body of the county has determined that eutrophication enhanced by human activity is occurring and that phosphorus is the limiting factor; and

(b) other efforts are being undertaken in the county to reduce the amount of phosphorus entering surface waters.

(3) Any ordinance adopted by the governing body of a county must contain standards designated by the model rule adopted by the department of health and environmental sciences under [section 1] and in effect at the time of the adoption of the county ordinance.

(4) Any ordinance adopted by the governing body of a county must be enforced by the county.

Section 5. **Penalty.** (1) A person involved in the sale or commercial distribution of any phosphorus compound prohibited by an ordinance adopted under [section 4] must be notified by the county and must be given 30 days from receipt of such notice to comply with the ordinance. Failure to comply with the ordinance following this 30-day period is a misdemeanor. Each day of violation is a separate offense.

(2) The penalty provided for in subsection (1) applies only to persons engaged in the sale or commercial distribution of prohibited phosphorus compounds. The county may not prosecute or otherwise penalize a person for using a phosphorus compound regulated by an ordinance adopted under [section 4].

Section 6. **Effective date.** This act is effective July 1, 1986.

Approved April 19, 1985.

The Tragedy of the Commons

"The tragedy of the commons develops this way. Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because natural and social events keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorsely generates tragedy.

As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility **to me** to adding one more animal to my herd"? The positive component of the herdsman receiving the proceeds of the sale of that one additional animal outweighs the negative component of the additional overgrazing created by the one added animal. Since the effects of overgrazing are shared by all the herdsmen, but the proceeds of the sale accrue only to the individual, the tragedy of the commons will continue.

The rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd. And another; and another. . . But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination to which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all."

Garrett Hardin. *Science*, December 1968.

lathead Basin Commission ■ biennial report

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